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CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

HUNTERIAN LECTURE on Neoplasms of the Testicle. By H. W. B. CAIRNS, M.B., F.R.C.S. 845

LUMLEIAN LECTURES (III.) on Endocarditis. By Sir THOMAS HORDER, K.C.V.O., M.D. 850

ORIGINAL ARTICLES.

The Serum Treatment of Diphtheria. By DONALD MACINTYRE, M.D., D.P.H. 855

On a Method of Cancer Research. By HASTINGS GILFORD, F.R.C.S. 858

Tuberculous Adenitis Treated by Radium. By PHILIP GOSSE, M.D. 862

CLINICAL AND LABORATORY NOTES.

Intussusception Presenting Unusual Features. By D. S. FAIRWEATHER, M.B., Ch.B. 863

Skin-Grafting in Acute Symblepharon. By J. M. BALL, M.D. 863

MEDICAL SOCIETIES.

Manchester Medical Society: Rickets 864

Liverpool Medical Institution: Acute Phlegmonous Gastritis .. 865

Nottingham Medico-Chirurgical Society: Sterility 865

REVIEWS AND NOTICES OF BOOKS.

Statistical Methods for Research Workers. By R. A. Fisher, M.A. 866

Die Lungentuberkulose. By Dr. Felix Klemperer 867

Essentials of Psychiatry. By George Henry, M.D. 867

Table of Veterinary Posology. By G. A. Banham, F.R.C.V.S., and Wm. J. Young, F.R.C.V.S. 868

Pancréatites Chroniques avec Ictère. By Dr. Pierre Mallet-Guy 868

LEADING ARTICLES.

THE MEDICAL USES OF RADIUM 869

THE SURGERY OF THE SPLEEN 870

HELP IN CHOOSING A CAREER 870

ANNOTATIONS.

Merchant Seamen 871

Hospitals and Recovery Homes 871

A Remarkable Case of Cancer 872

Guilty but Insane 872

Royal Institute of Public Health 873

Smell 873

Control of Urinary Incontinence by the Gracilis Muscle 873

Collip's Parathyroid Hormone 874

Post-Vaccinal Nervous Disease 874

Mule-Spinners' Disease 874

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force.—The Parkes and the Alexander Memorial Prizes 875

SPECIAL ARTICLES.

Standard Death-rate for British Merchant Seamen (II.). By Fleet Surgeon W. E. Home ... 877

International Surgical Congress, Rome 879

Paris: Vital Statistics for 1925.—Reorganisation of the Military Medical Service 880

Berlin: Signed Articles in the Public Press 881

Medicine and the Law: Verdict of Negligence against Doctor for Certifying an Alleged Lunatic.—Dangerous Drugs Act Charges 882

Exhibition at the Optical Convention 883

Infectious Disease in England and Wales 888

MODERN TECHNIQUE IN TREATMENT.

CLXX.—The Treatment of Tuberculous Disease of the Spine. By Sir HENRY GAUVAIN, M.D., M.Ch. 875

CORRESPONDENCE.

What is Orthopædic Surgery? (Mr. R. C. Elmslie) 884

Miners' Nystagmus: A Tentative Theory (Dr. J. Prosser Davies) 884

The New Health Society (Sir W. Arbuthnot Lane) 885

Diabetes, A Recoverable Disease (Dr. O. Leyton). 885

Blood-sugar in Encephalitis (Drs. H. S. Pemberton and W. D. Jeans) 885

Ionic Medication (Dr. A. R. Friel) 885

Neuritis and Neuralgia (Dr. Wilfred Harris) ... 885

OBITUARY.

John William Smith, M.B., F.R.C.S. 886

John Edgar Percival Shera, M.D. 886

NEW INVENTIONS.

Axis-Traction Forceps. By J. HAIG FERGUSON, M.D., F.R.C.S.—(*Illustrated*) .. 868

MEDICAL NEWS.

Royal College of Surgeons of England 886

Royal College of Physicians of Edinburgh, &c. 886

Progress of Shropshire Hospital 863

An Historic Orthopædic Hospital 871

Foreign Decoration 876

Donations and Bequests .. 883

Indian Medical Service Dinner Fund 887

Society of Medical Officers of Health 887

British Institute of Philosophical Studies .. 887

Pharmaceutical Society of Great Britain 887

Fellowship of Medicine and Post-Graduate Medical Association 887

Illuminating Engineering Society 887

National Milk Conference .. 887

Trinity College, Dublin, Montgomery Lectures .. 887

Seamen's Hospital Society 887

The late Sir Sydney Russell-Wells 887

University of London 887

Medical Golfing Society .. 888

Maudsley Hospital, Denmark Hill 888

British Science Guild ... 888

Conference on Mental Welfare 888

University of Leeds 888

Voyages d'Études Médicales 888

Enlargement of Charing Cross Hospital 893

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: The Economy Bill: Medical Benefit.—Health Insurance in the Services.—Allocation of the Composition Sum of 13s.—Making Good Deficiencies. Midwives and Maternity Homes Bill 888

House of Commons: Service Medical Organisation.—University of London.—Slum Clearances.—Progress of Housing Schemes.—Deposit of Refuse in Rural Areas —Miners' Welfare Fund and Hospital Grants.—Indian Medical Service.—The Tuberculosis Order, 1925 ..... 891 892

NOTES, COMMENTS, AND ABSTRACTS.

Healing Saints 893

Australian Hospitals 893

Estimation of Basal Metabolic Rate.—(*Illustrated*) 894

Vocal Therapy for Disabled Men 894

The North-Western Naturalist 894

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Hunterian Lecture
ON
NEOPLASMS OF THE TESTICLE.*

Delivered before the Royal College of Surgeons of England on Feb. 12th, 1926,

BY H. W. B. CAIRNS, M.B. ADEL., F.R.C.S. ENG.,
HUNTERIAN PROFESSOR OF THE ROYAL COLLEGE OF SURGEONS; ASSISTANT SURGEON TO THE LONDON HOSPITAL.

THE great majority of testicular tumours fall into two main groups: (1) *Mixed tumours*. This term is here used in its widest sense to denote tumours composed of several types of tissue, all of them truly neoplastic. (2) *Spheroidal-celled tumours*, which, according to the interpretation of individual workers, have been variously described as alveolar sarcoma, carcinoma, séminome, spermatocytoma. Having studied at the London Hospital some 95 tumours of the testicle and its adnexa, I have found that 93 per cent. of the primary tumours of the testicle itself belong to one or other of the above groups. The two groups are approximately equal in their frequency.

Thanks largely to the classic paper of Wilms [1] in 1896 it is now generally realised that the mixed tumours are teratomata. Numerous views have been advanced as to the nature of the spheroidal-celled tumour, but it is only necessary here to mention the view of Ewing,[2] who claimed in 1911 that spheroidal-celled tumours were teratomatous. More recent workers have declared against this view, but, from the evidence provided by this series of cases, I believe that Ewing was right in his main contention, and that these common tumours are one and all teratomatous.

GENERAL CONSIDERATION OF TERATOMATA.

At the outset it is very necessary that I should place before you the views at present held as to the nature and origin of teratomata. I need scarcely point out that there is no measure of finality in these views, for the simple reason that the subject in its essence is intimately connected with, and dependent upon, some of the unsolved though fundamental problems of human biology and embryology. All that we seek is the best explanation of the facts about teratomata so far as they are known.

It is generally agreed that a mixed tumour which contains derivatives of all three germinal layers (epiblast, mesoblast, and hypoblast) is a teratoma. If the tissues of the tumour are of the fully differentiated adult type, and if their arrangement is more or less orderly and imitative of structures in the adult body, then the teratoma is said to be typical or adult. If, on the other hand, the tissues are in a state of incomplete differentiation and are wanting in orderly arrangement, then the teratoma is atypical or embryonal. In reality, there is no sharp morphological line of division between these two groups, yet the terms have a definite value clinically, and they also make us recognise a remarkable quality exhibited to a greater or lesser degree by every teratoma—the quality of differentiation.

The teratoma must be conceived to represent a separate individual, "an autonomous growth, the product of the continued development within one individual of another individual of the same species" (Adami [3]). There are many observations, both macroscopic and microscopic, which support this conception, but the actual proof rests upon the discovery of chorionic elements in teratomata. In 1902 Schlagenhaufer [4] demonstrated areas of chorion carcinoma in teratomata of the testicle, and his observation has since been amply confirmed. Chorionic elements are undeniably fœtal, and their presence in teratomata, therefore, proves conclusively that such tumours are to be regarded as separate individuals. The stimulation of the breasts to secretory activity by these tumours, a point referred to below, is further evidence of their fœtal nature.

As Adami has pointed out, teratomata are best explained as arising from totipotent cells—that is to say, cells which possess the power of giving rise to every order of cell in the body. First and foremost among such cells is the fertilised ovum; but there are also other totipotent cells, chief of which are the germ cells, and the first products of somatic development, the primordial blastomeres. As somatic development proceeds the cells of the body become more and more differentiated, and at the same time more and more restricted in their potentialities. Whereas the primordial blastomeres are totipotent and are capable of giving rise to an individual, the cells of the three-layered embryo are at first pluripotent but ultimately become unipotent; when the fœtus is fully differentiated the cells of any organ or tissue only give rise to like cells.

If we accept this view it is no longer possible to regard teratomata as arising from the paradidymis, or, as some recent writers [5] have it, "possibly from some vestigial mesonephric structure." The mesonephros is mesoblastic, and cannot give rise to the epiblastic or hypoblastic components of a teratoma. There is at present no evidence in favour of the view that metaplasia can occur between tissues of different germinal layers.

In the testicle, as in other organs in which teratomata of tridermal (triphyllic) structure occur, there are also found mixed tumours in which it is only possible to demonstrate derivatives of two germinal layers (diphyllic tumours). These are best regarded as being truly teratomatous and arising from totipotent cells. For, apart from the fact that absence of derivatives of one germinal layer may be merely apparent and due to incomplete microscopic examination, there is no reason to suppose that a totipotent cell must always exert its full potentiality. For similar reasons tumours of the testicle which contain multiple derivatives of one germinal layer (monophyllic mixed tumours) may be regarded as teratomatous. Here, however, my experience leads me to the conclusion that a thorough examination of mixed tumours of the testicle never fails to reveal evidence of structures derived from at least two of the germinal layers.

TERATOMA TESTIS.

1. *Typical Teratoma (Testicular "Dermoid").*

Structure.—This tumour bears a very close resemblance to the more common "dermoid cyst" of the ovary. It consists usually of a large cyst, lined by skin and filled with hairs and sebaceous material. When the main contents of the cyst are cleared away there is found on some part of the cyst wall a protuberance (embryonal rudiment, or Zotte), which contains many diverse structures—brain tissue, teeth, bone, cavities resembling œsophagus and trachea, and so forth. In testicular "dermoids" the embryonal rudiment may sometimes be very large and may almost completely fill the cavity of the main cyst, thus giving to the tumour a more solid appearance. Occasionally the main cyst is lined by nervous tissue, as in a beautiful specimen taken from a cryptorchid colt, and kindly placed at my disposal by Mr. Frederick Hobday. A thorough histological examination of these tumours never fails to reveal evidence of their triphyllic structure.

Habits.—The testicular "dermoid" is common in the horse, and is in that animal frequently associated with cryptorchidism (Hobday [6]). In man it is a rare tumour, and I have only been able to find records of 47 undoubted cases. From an analysis of these it is possible to confirm the contention of Verneuil [7] that the tumour is congenital, for of the cases in which data were available 62 per cent. were observed at or shortly after birth, and in 84 per cent. the tumour

* The work on which this lecture is based will be published elsewhere at a later date.

appeared within the first year of life. In only 5 out of 44 cases was the tumour first observed in adult life, and in one of these (Lexer [8]) the testicle lay within the abdominal cavity.

The tumour runs a remarkably benign course. It may exist for as long as 40 years before the patient seeks relief. I can find in the literature no authentic record of spread by metastases, nor can I find any histological study which provides undoubted evidence of malignancy of the testicular "dermoids." Similar tumours in other parts of the body occasionally become malignant, so it is not impossible that testicular "dermoids" may do the same. For the present, however, we may conclude that the tumour is essentially benign.

Site of Origin.—The occasional appearance of an almost normal testicle at one or other margin of the tumour suggests the idea, first advanced by Verneuil, that the "dermoid" has an extra-testicular origin. There are, however, now on record a number of cases in which the "dermoid" is entirely surrounded by testicular tissue, and the published cases on critical examination furnish no proof that the growth arises outside the testicle. Verneuil conceived the testicular "dermoid" to be the inclusion of a parasitic fœtus. This we now know to be incorrect, for "dermoids" arise in undescended testicles, where, according to embryologists, fœtal inclusion can never occur.

2. *Atypical Teratoma (Mixed Tumour).*

The atypical teratomata occur with much greater frequency than do those of the preceding group, for they comprise approximately half of all the primary tumours of the testicle. In design they follow the same general lines as the typical teratomata, but they differ remarkably from the latter in their extreme malignancy. They are found most commonly in adult life between the ages of 20 and 40 years.

Structure.—These tumours are composed of many different tissues in various stages of differentiation. They present in complex array tissues similar to those found in the normal fœtus—cartilage, involuntary muscle, jelly tissue (the so-called "myxomatous" tissue), tubules or cysts lined with columnar epithelium usually of a mucous type, stratified squamous epithelium, and so forth. But they contain also other tissues, so little differentiated that it is impossible to determine what part of the organism or which germinal layer they represent. These "undifferentiated" tissues usually predominate.

The tissues found vary widely in individual tumours, and the naked-eye appearances are correspondingly variable. The most usual type is a solid tumour composed of soft, white, necrotic and hæmorrhagic tissue with here and there a few cysts, or tiny lobules of cartilage. In such tumours a most thorough examination is necessary to obtain evidence of a triphyllic or even a diphyllic structure. A more unusual type of tumour is one which, composed largely of differentiated tissues, presents to the naked eye a "fibro-cystic" appearance, or a preponderance of cartilage. The one characteristic macroscopic feature of atypical teratomata is that the living portions of the tumour are not perfectly uniform in appearance.

The quality of differentiation is remarkably well shown by these tumours. Their tissues differentiate in the same way as do those of the normal fœtus. All transitions can be observed between the earliest cartilage, appearing in the centre of a group of spindle cells, and cartilage which is undergoing ossification. Primitive voluntary muscle-fibres are seen to assume transverse striation of their cytoplasm. Tubules lined with mucous goblet cells become surrounded by first a circular, then an outer, longitudinal coat of involuntary muscle; they are forming by their differentiation a perfect imitation of primitive gut. Megaloblasts are seen losing their nuclei, becoming thus transformed into erythrocytes. . . .

The observation of these differentiations provides a most fascinating but time-consuming histological exercise. The changes can usually be followed only in those structures which, like cartilage, present a distinctive and easily-recognised histological picture. But anyone thoroughly familiar with the histology of the early embryo could doubtless trace similar changes in other structures of the tumour, particularly in the structures of glandular type.

Malignancy.—A certain hesitancy is evident in many of the writings on this question. Earlier workers were inclined to regard the atypical teratomata as benign, but liable to undergo malignant change. Concerned mainly with establishing the fact that fibro-cystic and certain of the solid tumours of the testicle were actually teratomata, they neglected to follow up their cases. They were influenced in their views by the behaviour of the typical teratomata or "dermoids," already shown by Verneuil to be benign, and doubtless also by the observation that atypical teratomata may exhibit remarkable variation in their rate of growth. But this peculiarity is shown also by the metastases of atypical teratoma. Both primary and secondary tumours may remain apparently stationary for years without affecting the health of the host. Then suddenly, perhaps after an injury, they take on rapid growth, and by further extension soon destroy their host. I was able to observe a remarkable case in which a metastatic lump in the groin, appearing soon after removal of the primary tumour, remained almost stationary for over two and a half years, and only began to grow rapidly after it had been examined by a large class of students. Post hoc or propter hoc? I do not know. But whatever its cause this rapid growth of the lump was associated with further extension of the disease, and the man was dead within six months.

On following the life-history of a number of cases it is evident that the atypical teratomata of the testis are among the most malignant tumours known to man.

The after-history of 34 of the 35 cases of this series, which was begun in 1908, has been traced to the end of 1925; 22 have died of metastases, in 12 cases within six months of the onset of symptoms. On histological examination the tumour is seen to spread by invasion of the surrounding testicular tissue, the epididymis, spermatic vessels, tunica vaginalis, and even the scrotum. With histological evidence of this nature it has been possible to show that 80 per cent. of the cases of this series were malignant.

The metastases usually have a mixed structure. In six of the ten cases of this series in which metastases were examined, derivatives of two germinal layers were found, and in one other case they contained derivatives of all three layers. While they are composed chiefly of undifferentiated tissue, the metastases occasionally show structures of a perfectly benign appearance; for example, tubules lined with a single regular row of mucous goblet cells and surrounded by a layer of involuntary muscle. It sometimes happens that the metastases consist almost entirely of a differentiated tissue of benign appearance, as in Paget's famous case,[9] where the lungs, inferior vena cava, and spermatic vessels were occupied by cartilage. In other cases the differentiation of certain elements may be more advanced in the metastases than in the primary tumour. Occasionally the metastases present tissues not found in the primary tumour.

It is only by regarding the atypical teratomata as inherently malignant that these varying appearances can be explained. The primary tumour contains cells of differing potentialities. Any or all of these cells can spread to distant parts and there produce metastases. And in spreading they do not lose their power of differentiating. They are still capable of producing in the metastases perfect imitations of parts of the fœtus, structures of histologically benign appearance. It is, therefore, clear that the teratoma is not malignant through having undergone a "sarcomatous" or "carcinomatous degeneration," as some writers would have it. The tumour is inherently malignant. Both primary and secondary tumours are teratomatous.

3. *Chorion Carcinoma.*

Chorion carcinoma is found within the testicle either alone or in association with mixed or other teratomatous tumours of the testicle. Its structure is identical with that found in chorion carcinoma in women. It is extremely malignant. The primary tumour is occasionally small, and thus it happens that the patient frequently presents himself for symptoms produced by the metastases.

In a case, the details and materials of which were kindly placed at my disposal by Mr. Foster, of Reading, a man of 23 came complaining of a swelling of the left side of the face and a discharge of blood from the mouth. The left superior maxilla, which contained growth, was excised, and histological examination showed chorion carcinoma. Further examination then showed that the left testicle was the size of a small tangerine orange, hard and devoid of testicular sensation. The man died of extensive metastases five weeks after the appearance of the swelling in the face. The testicle contained a chorion carcinoma.

4. *Spheroidal-celled Tumour (Séminome).*

Structure.—This tumour is composed of a perfectly homogeneous white or greyish-white tissue, which is divided into lobules by fine and coarse fibrous strands. Areas of necrosis are almost constant, and small points of hæmorrhage frequent. The tumour is usually large, but a small scirrhous type also occurs, in which the fibrous septa are broad and the lobules of growth correspondingly diminished in size.

Microscopic examination reveals no mixture of tissues, but a tumour entirely composed of large spheroidal cells of striking appearance. Perhaps the most characteristic features of these cells are the prominence of their nucleoli, the powdered appearance of the nucleus, and the abundance and vacuolation of their cytoplasm. Multinucleate forms occur. The cells are arranged in large solid acini and trabeculæ. Within the acini, as Prof. Turnbull has long pointed out in his lectures, the formation of tubules is not infrequently seen. The tumour is extensively infiltrated with small round cells, chiefly small lymphocytes, but also plasma cells and eosinophile leucocytes.

Habits.—The spheroidal-celled tumour is undoubtedly malignant. Metastases were found in 21 of the 41 cases of this series. In the remaining 20 cases evidence of spread by invasion was obtained in all but three cases. The tumour is essentially one of adult life, and on the whole it tends to appear at a later period than does the atypical teratoma.

5. *"Combined" Types of Teratoma Testis.*

Recognition of the teratomatous nature of the spheroidal-celled tumour of the testis was due primarily to the discovery of tumours which, to the naked eye, were partly spheroidal-celled tumours and partly atypical teratomata. Observations of this nature were first made by Lecène,[10] and have since been confirmed by Ewing,[2] Jeanbrau and Massabuau,[11] Ferrero,[12] and others. In the London Hospital series of 77 cases there were six tumours in which the association of spheroidal-celled tumour with atypical teratoma could be recognised macroscopically. And in one of these there was, in addition, a large area of chorion carcinoma.

MR. MILNE'S *Case.*—This was a man aged 23, who died of metastases three months after swelling of the testicle was first observed. The testicle measured 9 × 7 × 5·5 cm. It was chiefly occupied by chorion carcinoma, but contained also hyaline cartilage, stratified squamous epithelium, and tubules lined with a single regular layer of columnar epithelium. In addition, on the posterior aspect of the upper pole there was an almond-shaped area (3·5 × 1·1 cm.) of homogeneous white tissue, which on microscopic examination proved to be typical spheroidal-celled tissue.

But the *microscopic evidence* is much more abundant. Atypical teratomata almost invariably contain among their undifferentiated tissues large irregular tubules and ill-defined solid acini, composed of cells which are identical in their structure with the cells of the spheroidal-celled tumour. Such cells were found in 32 of the 35 atypical teratomata of the present series. This point has been noted by Ewing.

THE ORIGIN OF TERATOMA TESTIS AND ALLIED TUMOURS.

As far as I am aware no direct observation has yet been made upon the origin of teratomata, either within the testis or elsewhere. The teratomata of the testicle are best explained as arising from totipotent cells. Of these there exist many in the normal testicle, and it is therefore not necessary to suppose, nor is it even probable, that the tumours arise from other totipotent cells, such as "dislocated" primordial blastomeres or primordial ova persisting within the testicle.

Work on the origin of the spheroidal-celled tumours throws suggestive light on the genesis of the whole group of teratomatous tumours. From the time of Langhans [13] many observers of note have maintained that they can trace the origin of the spheroidal-celled tumour from the seminiferous tubules. In support of this claim Dew [14] has recently brought forward some important observations. Ewing, recognising that the spheroidal-celled tumour is undoubtedly teratomatous, has gone yet further and has interpreted the tumour as representing the overgrowth of one element of a pre-existing teratoma. He regards the spheroidal-celled tumour as a teratogenous blastoma and rejects the claim that it arises from the seminiferous tubules.

There have thus sprung up two apparently irreconcilable schools of thought: the one holds that the spheroidal-celled tumour arises in the seminiferous tubules, the other claims that the tumour arises in a teratoma. My own observations show that the spheroidal-celled tumour is teratomatous in nature, but they do not provide evidence from which we may conclude that the tumour actually *arises* within a teratoma. In atypical teratomata transitions from spheroidal cells to mucous goblet cells and to squamous epithelium are clearly demonstrated; transition to mesoblastic tissue is not definite. The relations of the cells thus suggest that they may be differentiated to the extent that they are hypoblastic, but it is only possible to say that they are poorly differentiated cells, and that no less differentiated cell can be recognised in teratomata. They may, indeed, be the primary, totipotent cells of teratomata, and I have found some evidence that they do arise within seminiferous tubules.

Further work may, therefore, reconcile the two conflicting views, showing that the spheroidal cell arises within seminiferous tubules and that it is a totipotent teratomatous cell. Such an explanation as this would be in perfect accord with our knowledge of the seminiferous tubules. For, as Prof. Turnbull has pointed out to me, spermatogonia are totipotent cells which possess the power of dividing into cells of similar potentiality. A tumour arising, for instance, from spermatogonia would be a multiplication of cells which apparently have all the potentiality of totipotent cells; any or all of them could form a teratoma. This view would explain well the varieties of tumour which are found in the teratoma group, and would provide for their common origin. (1) Tumours composed entirely of undifferentiated (totipotent) cells = spheroidal-celled tumours. (2) Tumours composed of tissues in various stages of differentiation = teratomata. (3) Tumours composed of a mixture of undifferentiated (totipotent) cells and differentiating tissues = the "combined" tumours.

INTERNAL SECRETION AND TERATOMA TESTIS.

It is a remarkable fact that true hypertrophy of the breasts may follow the development of teratoma testis or of its metastases. The phenomenon was observed in two cases of this series. The enlargement in both cases coincided with the development of the metastases. In one case, under the care of Sir Hugh Rigby, the breasts were examined at necropsy. They measured 8 cm. in diameter and up to 1·7 cm. in depth, and they contained very numerous dilated ducts and ductules, which showed proliferation and desquamation of their lining epithelium. In another

case of this series the patient gave a history of transitory swelling of the breasts and axillary glands, two months before the swelling of the testicle was first observed. Three cases of this type are reported in the literature by Garbarini,[15] Cooke,[16] and Warthin,[17] and my friend, Dr. Archibald Malloch, of Montreal, informs me that he has had one case. In Garbarini's case the breasts subsided after removal of the affected testicle. In the cases of Cooke and Warthin and Malloch the testicle contained chorion carcinoma.

These observations provide indirect evidence in support of Starling's original contention[18] that the normal fœtus produces a hormone which acts *directly* upon the breasts. Sacchi[19] has reported an interesting case in which a tumour of the testicle was associated with male sexual precocity.

ÆTIOLOGY OF TERATOMA TESTIS.

Relation to Injury.—It is unlikely that an injury of the testicle can by itself give rise to a tumour. For, whereas tumours of the testicle are uncommon, almost every active male receives at some time or other in his life a blow on the testicle. Yet there is a definite association between injury and testicular tumour. In 14 of the 79 cases of this series in which the clinical history was recorded the testicular enlargement followed, or was first observed, shortly after a local injury. Other observers have obtained a history of injury in as many as 50 per cent. of their cases.

Writing in the eighteenth century Percival Pott[20] recognises that cancer follows injury of the testicle; he continues, "but (to say) that previous to such accident, there was no cancerous disposition or malignity in the habit, is an inference that cannot be admitted." The following remarkable case suggests that the true relationship between injury and tumour of the testicle is expressed in this cautious proviso of Pott's.

Mr. WALTON'S *Case.*—S. B., aged 49, had been wounded by a bomb in February, 1918. From a recent examination of the scars it appears that a projectile had seared a transverse groove across the front of the upper part of the left thigh, and had then passed through the lower part of the scrotum and the hamstrings of the right thigh. Four months after being wounded the patient noticed that the left testicle was enlarged. From that time it gradually increased in size until his admission to hospital in July, 1919.

The left testicle was enlarged and hard. In the right side of the scrotum there was a small isolated nodule about 1 inch in diameter. This nodule lay in the subcutaneous tissue alongside of one of the scars. It was not attached to the right testicle, which was normal. At operation Mr. Walton removed the left testicle and spermatic cord, and at the same time excised the nodule and overlying skin from the right scrotum. The left testicle was entirely occupied by a typical spheroidal-celled tumour, save at the lower pole, where there was a small cyst (3·5 cm. diameter) immediately beneath the tunica albuginea. The nodule from the right scrotum had a microscopic structure identical with that of the primary tumour.

When last seen, over six years after operation, the patient was perfectly well and showed no signs of further metastases.

Bearing in mind that the scrotal metastasis was evidently solitary, and that it occurred in a most unusual position, in the track of a projectile, I suggest that the most adequate explanation of this case is to suppose that the testicular tumour was already present before the patient was wounded, and that the metastasis was produced by the carriage or spread of tumour cells along the path of the projectile. There is, therefore, reason to suspect that injury of the testicle does not give rise to the neoplastic process; its part is rather to stimulate to more rapid growth a pre-existing but hitherto unobserved tumour.

Relation to Undescended Testis.—While in the horse teratoma testis is commonly associated with cryptorchidism, in man there is no such close relationship. Mr. Russell Howard,[21] from a wide experience, concludes that there is no great difference between the relative frequency of malignant disease in the imperfectly descended testis and in the normal organ. In only five of the 77 human cases of this series was the affected testicle not in the scrotum. In three cases it was in the iliac fossa, and in two others it was lying on the external oblique. In one of these two torsion of the spermatic cord had occurred; the tumour (2 cm. in diameter) was only discovered after removal of the testicle. There were two other cases in this series in which a scrotal testicle contained a tumour, while the other and undescended testicle was unaffected.

THE EXTENSION OF TERATOMA TESTIS.

With the single exception of the typical teratoma or "dermoid" all varieties of teratoma testis have been shown to be extremely malignant. There are minor variations in the intensity of the malignancy: chorion carcinoma destroys the host with astonishing speed, and the atypical teratoma is more rapidly fatal than is the spheroidal-celled tumour. It is, perhaps, for this reason that invasion of the epididymis is most frequently seen in the spheroidal-celled tumour.

In all varieties of teratoma testis, metastatic extension occurs by way of the veins or lymphatics of the spermatic cord, and results usually in the development of a secondary tumour in the lumbar glands. In 29 out of 33 cases in which data were available the first metastases to appear were situated either in the lumbar glands or along the course of the spermatic vessels. We may conclude, therefore, that the operation designed for the removal of the spermatic vessels and lumbar glands does at least rest on a sound basis of morbid anatomy.

In the lumbar glands the metastases usually grow to an enormous size and eventually form a huge confluent mass, through the centre of which pass the abdominal aorta and inferior vena cava. The mass is palpable above and not below the umbilicus as a deeply-placed ill-defined swelling. Its clinical importance is not confined to the fact that it provides evidence of the inoperability of any particular case, for by its invasion of surrounding structures it produces diverse clinical pictures, the significance of which may elude the observer if the primary tumour has escaped notice. The lumbar mass may invade the lumbar vertebræ and produce paraplegia, as in a case quoted by Curling.[22] Both ureters may be obstructed with resulting hydronephrosis and uræmia. Destruction of the adrenal bodies doubtless accounts for the extreme wasting which occurs in many cases. But the most common clinical manifestation of the lumbar metastases is, undoubtedly, intestinal obstruction, due to the formation of adhesions between small intestine and the anterior surface of the growth. Invasion of the lumen of the inferior vena cava is also a frequent occurrence; it may be followed by thrombosis of the vein and great œdema of the legs, or by a pulmonary embolism. Perhaps the most remarkable case in this series, from the clinical point of view, was one in which a neoplastic embolus passed from the spermatic vessels to the heart, thence by way of a patent foramen ovale to the right middle cerebral artery. This patient was at work when he suddenly had a "stroke." He died a few days later.

THE OTHER TUMOURS OF THE TESTICLE.

Now that so many tumours are recognised to belong to the teratoma group, the question arises whether there really are any other primary tumours of the testicle. There occur in this series three cases which must from their structure be regarded as fibromyosarcoma, round and spindle-celled sarcoma, and angeio-endothelioma respectively. Such tumours could certainly arise from the stroma of the testicle, but it is difficult to be sure that they are not teratomata, for in each case the microscopic examination was limited to a small portion of the tumour.

Lymphosarcoma.—There is, however, one distinct and homogeneous tumour which, so far at least, has not been proved to be teratomatous—that is the lymphosarcoma. I have encountered three such

cases. The tumour is entirely composed of small cells which measure 5 to 9 microns in diameter. The cytoplasm is relatively scanty, the nucleus notched or lobed, and deeply stained. The cells infiltrate the stroma of the testicle without destroying the seminiferous tubules. They themselves form no connective tissue. A very characteristic picture is thus produced. Microscopically the seminiferous tubules appear as islands amid a sea of tumour cells, and on naked-eye examination the tumour, which is of rubbery consistence, still faintly reveals the pattern of the normal testicle. It has, too, something of the colour of the normal testicle. The tumour is extremely malignant; metastases rapidly appear in many tissues and organs, particularly in lymphatic glands.

It is impossible at present to state the exact nature of these "lymphosarcomata." Their cells possibly arise from blood-forming cells and may be teratogenous.

CLINICAL DIAGNOSIS.

Early diagnosis is important. Mr. Hugh Lett removed a testicle which contained near the hilum a spheroidal-celled tumour only 2 cm. in diameter. The veins of the lower part of the spermatic cord were nearly all filled by growth. But in spite of this the patient was alive and well when last heard of, 12 years after the operation. There are no specially distinctive features about the swelling produced by tumour of the testicle, and the condition is frequently confused with hæmatocele, gumma, and tuberculous epididymitis. Palpable lumbar glands are, of course, diagnostic, but the diagnosis should be made before the appearance of the metastases if it is to be of any practical value. To appreciate the finer points of a scrotal swelling it is best always to examine the patient in the recumbent position.

Hæmatocele.—When a hæmatocele is large and its blood content still for the most part fluid, it may be distinguished from a large testicular tumour by the fact that its surface is uniformly smooth, whereas in tumour small nodular projections can almost always be felt on some part of the surface. French diagnosticians lay stress on the fact that the head of the epididymis is not palpable in hæmatocele, but as it is always invaded by growth, or greatly compressed, in large tumours of the testicle, this point is of little value practically. It is almost impossible to distinguish between the old solid and calcified hæmatocele and a tumour, but the treatment is the same for both.

Gumma.—It is scarcely an exaggeration to say that the Wassermann reaction should never be employed in the differential diagnosis of gumma and neoplasm of the testicle. A positive Wassermann reaction indicates the presence of a syphilitic lesion, but that lesion may not be the one under surgical observation. In three cases of this series the discovery of a positive Wassermann reaction resulted in a long and unnecessary delay of operative treatment, while the patient received injections of novarsenobillon. A simple and effective method of distinguishing the gumma is provided by the oral administration of mercury and iodides. The effect of this mixture upon a gumma is most dramatic: often within three days the testicle begins to shrink. It is safe to say that if within a week there is no change in its size, then the swelling is not a gumma. This method should be used in all doubtful swellings, for the delay of operation is negligible. In my experience the mixture of mercury and iodides has no effect upon the size of tumours.

Tuberculous Epididymitis.—Tumours of the testicle frequently, though not invariably, arise in the neighbourhood of the rete testis, and growth may advance at an early stage into the mediastinum testis and the lower end of the spermatic cord so as to simulate an enlargement of the epididymis. Such cases are frequently mistaken for tuberculous epididymitis, and I know of no constant rule by which to distinguish them. The absence of beading of the vas deferens and nodular enlargement of the prostate by no means excludes tuberculous epididymitis, and a definite diagnosis may only be possible at operation. All doubtful cases should be submitted to exploration.

Hydrocele.—In cases of common hydrocele the question may arise, either on clinical examination or at operation, as to whether the testicle contains a tumour. While it is unwise to be dogmatic, it is safe to say that the association of a *large* secondary hydrocele with tumour must be an event of extreme rarity. John Hunter [23] said that he had never seen a case. By far the largest secondary hydrocele in this series contained 10 oz. of fluid. In cases like this last it is useful to aspirate the fluid in order to feel the testicle. But in most cases there is little fluid and the use of the exploring needle is entirely contra-indicated, for it provides no useful information.

TREATMENT.

The benign typical teratomata can occasionally be dealt with by enucleation, but as a rule it is more satisfactory to perform orchidectomy. Orchidectomy has been, and still is, the treatment most generally employed for malignant tumours of the testicle, but the frequency with which the disease recurs in the lumbar glands has led surgeons to devise a more radical operation. In its present form this operation aims at the removal of testicle, spermatic cord, intra-abdominal spermatic vessels and lymphatics, and the lumbar glands, all in one piece. The operation was introduced into this country by Sir John Bland-Sutton [24] in 1909, and the time is ripe for us to inquire into its merits as compared with the more simple operation of orchidectomy. I propose, therefore, to place before you the results of the London Hospital series.

During the last 18 years, 1908–1925, 74 cases were treated by operation, 55 by orchidectomy, and 19 by the radical operation. All cases recovered from operation and were discharged from hospital. The after-results were traced up to the end of 1925 in all but six cases, with the assistance of the Registrar-General in 11 cases. Recurrence of the disease proved to be extremely rare after two years, and estimations on the basis of a three-year cure are, therefore, approximately accurate. One case in which death from influenza and broncho-pneumonia occurred over three years after operation has accordingly been regarded as a cure. Patients in whom the lumbar glands were already palpable on admission have been considered incurable, either by orchidectomy or by the radical operation.

Table Showing Results of All Cases up to the End of 1922.

	Orchidectomy.	Radical operation.
1. Untraced	5	1
2. Lumbar glands palpable before operation	2	—
3. Died of metastases (excluding Group 2)	24	11
4. Died from other causes	—	1
5. Alive and well	12	4
Total	43	17

From the table, which gives the results of all cases up to the end of 1922, it is seen that the rate of recovery is, after orchidectomy, 33·3 per cent., and after the radical operation 31·2 per cent. These figures are not quite comparable, for it so happens that relatively more spheroidal-celled tumours were treated by orchidectomy, whereas most of the cases treated by the radical operation were atypical teratomata, tumours of greater malignancy. It follows that the radical operation was set a harder test than the local operation.

On the whole, therefore, I am of the opinion that the results are slightly in favour of the radical operation. Yet it is questionable whether they are a sufficient improvement over the results of orchidectomy to justify the added risk. The London Hospital figures of 19 radical operations with no deaths do not give

a true indication of this risk, for the 77 cases reported or collected from the literature by Hinman and his associates [25] show an operative mortality of over 10 per cent.

There are certain a priori reasons against the radical operation. Handfield-Jones,[26] who has recently mapped out the lymphatic drainage of the testicle, has confirmed the conclusion of Jamieson and Dobson [27] that complete removal of the lumbar glands and lymphatics is a surgical impossibility. Again, the operation itself is so often disappointing: either there are metastases so closely adherent to the aorta or inferior vena cava that they cannot be removed, or there are no metastases, and the surgeon can find nothing to remove but the spermatic vessels and one or two small lymph glands—a very small amount of tissue for such a large operation. Hinman, however, has collected or described four cases in which the lumbar glands removed at operation were found to contain secondary growth. The patients were alive and well over four years after operation. These cases would probably not have been cured had they been treated merely by orchidectomy, though it is well to note that at present we have no definite proof that lymph glands are not capable of destroying small secondary deposits of tumour tissue.

This concludes the evidence for and against the radical operation. That it is meagre is not surprising when we recall that the operation has only been practised for 20 years and that the number of cases is small. I do not think, therefore, that we can with equity reach a final decision. The London Hospital cases show that the radical operation can be performed with no immediate mortality. In view of this and of the results so far obtained, I consider that the radical operation is warranted a further trial.

In this series treatment of metastases by X rays has been entirely unsuccessful. Some workers have reported good results from the use of radium, but of this I have had no experience.

In conclusion, I would like to thank the visiting staff of the London Hospital for permission to study their cases and for much helpful advice. The pathological material upon which this lecture is based has been collected and carefully recorded by Prof. H. M. Turnbull, director of the Pathological Institute of the London Hospital, and by his assistants, in particular Dr. W. W. Woods. To Prof. Turnbull I am deeply indebted for allowing me access to this material and for his constant inspiration and assistance.

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Lumleian Lectures
ON
ENDOCARDITIS.

The Third Lumleian Lecture in 1926, delivered before the Royal College of Physicians of London on March 30th,*

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I PROPOSE now to deal with the anatomical and bacteriological parts of my subject, and then with considerations of diagnosis, pathogenesis, and treatment.

STATE OF THE VALVES PRIOR TO THE ONSET OF SEPTIC ENDOCARDITIS.

This is an important point. In my original series of 118 post-mortems in 150 cases I found evidence of old valvular disease in 80 per cent. The figures of other observers approximate very near to this. But it is to be noted that this figure refers to acute and chronic cases when taken together. If we consider acute cases alone the figure is undoubtedly much smaller. If we take the series of cases of ex-soldiers by themselves we find it smaller still. Thus, out of 13 autopsies in this class, Starling found scarring from old rheumatic disease in one only. Carey Coombs's experience is much the same. The inclusion of 20 cases of ex-Service men explains why, in a second series of 162 cases at St. Bartholomew's Hospital, the figure is only 50 per cent. Sir John Rose Bradford, in his Lumleian lecture in 1920, stated that, despite the prevalence of sepsis in the wounded during the great war, infective endocarditis was uncommon; that a number of acute and rapidly fatal cases of the disease occurred in men in whom no primary source of infection could be found post mortem; and that in these cases the infection had attacked healthy valves. Summing up, therefore, it may be said that in acute cases generally, and in the chronic ex-Service cases, there is a notable absence of pre-existing valvular disease; in chronic civilian cases there is a marked preponderance of pre-existing valvular disease. It has, perhaps, been too readily assumed that the nature of the pre-existing valve damage found at autopsy is generally rheumatic in origin. Care must be taken, as Libman has pointed out, to distinguish the residues of rheumatic infection from the residues of an old septic endocarditis, since it is now known that this latter process may recur after years of apparent freedom from active infection. The patient's history is, therefore, of great importance in judging the nature of cicatricial and of sclerotic changes in the valves. Since pericarditis is known to be quite rare in chronic septic endocarditis, evidence of this at autopsy is much in favour of old rheumatic infection. The type of myocardial disease, if this be present, may also assist in a correct interpretation of the findings.

Of the *valves affected* it is again important to distinguish acute from chronic cases and civilian chronic cases from ex-Service chronic cases. In acute cases the incidence of mitral and aortic disease is probably about equal. Of 34 such cases due to *Streptococcus pyogenes*, Thayer found the aortic valve involved in 20 cases, the mitral in 26. Gonococcal infection, however, tends to attack the aortic valve by preference. Thayer's cases, forming the fullest series of which we have details, showed 66 per cent. aortic and only 19 per cent. mitral. There were right heart lesions as often as mitral in this infection. Of 40 cases of pneumococcal endocarditis, Thayer found the aortic cusps involved in 20, the mitral in 13, and the valves on the right side of the heart in seven only, thus dis-

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posing of the fallacy that pneumococcal infection is prone to attack the right heart chiefly. In chronic septic endocarditis, however, there is a preponderance of mitral infections in civilian cases, and a still greater preponderance of aortic cases in ex-soldiers.

Mural Infection.

Mural infection is, I believe, more common than is generally thought. I found instances of this condition in 52 per cent. of 118 post-mortems. Thayer's figure is as high as 84 per cent. in chronic cases. Auricular infection is much more common than ventricular. The occurrence of mural endocarditis is usually attributed to the influence of pre-existing scars from old rheumatic disease. The occurrence of mural lesions without valve lesions must be quite rare. I cannot find any case in the literature which is at all comparable with one which I described in my original series, and where, fortunately, a post-mortem examination was possible. The disease had lasted for over two years, the type being very chronic, the fever very mild. There was no sign of valvular disease during life. This patient was for some weeks in a sanatorium on account of pyrexia, sweats, and malaise, it being thought that she might be a case of pulmonary tuberculosis without physical signs. She developed multiple infarction of the spleen and blood cultures were positive. Eventually she died of cerebral embolism. Post mortem there was found a small area of fungating auricular mural endocarditis, situated well above the mitral orifice, the cusps of which were natural. The importance of knowing that such cases exist lies in the fact that the disease may be present in the absence of signs of valvular mischief. But, as already stated, such cases are rare.

PARASITOLOGY.

I pass now to a consideration of the parasitology of endocarditis. I need not dwell upon the infecting agent in the syphilitic cases, except to point out that all the evidence favours the view that the route of infection is by the vasa vasorum to the middle coat of the aorta, and that it is, therefore, probable that the aortic cusps are infected likewise from the depths rather than from the surface.

Nor must I dwell long upon the old controversy anent the *causative agent in acute rheumatism.* Of late years there has been a growing tendency to consider the streptococcal origin of acute rheumatism as proved. But clearly this is not so, and it seems to me that we do but obstruct further research by so premature a conclusion. With due deference to Poynton and Paine, whose thorough and masterly work all must admire, it is to be doubted if the real picture of acute rheumatism has yet been experimentally produced in animals by the use of the "diplococcus rheumaticus." Nor is there, so far, anything like unanimity amongst the many observers who have given pains to the question of blood cultures in rheumatic fever, and to the bacteriological investigation of fatal cases of the disease. Unfortunately, the opportunities for this particular research become less and less with the decrease in incidence of severe rheumatic fever, but when the disease was rife, and even now, when it occurs, the number of negative results in the hands of skilled bacteriologists were, and are, strikingly large. And this, too, when the most approved culture methods are adopted. Such strains of cocci as are occasionally found in these cases seem to possess no special features, and considerable weight must be attached to the fact that the blood in cases of acute rheumatism has failed to yield any specific serological affinity, even for those homologous streptococci that have been isolated from the circulation of rheumatic patients. Such is the experience of Swift and Kinsella, who record the following striking case. A streptococcus was isolated from the blood of a patient in a first attack of rheumatic fever. A relapse occurred after a year of good health, and a second streptococcus was this time isolated. The two streptococci differed culturally and serologically. No complement-fixing antibodies against the first streptococcus could be demonstrated in the blood at the time of the second infection. Clawson and Bell have quite recently claimed to obtain a streptococcus by blood culture in 50 per cent. of cases of rheumatic fever. Yet they, again, failed to find antibodies in the blood at a serum dilution higher than 1 in 50. On the other hand, Clawson considers that he has produced lesions in rabbits' hearts which were morphologically identical with the Aschoff nodule by the use of rheumatic strains of streptococci. He therefore concludes that streptococci, generally of the viridans type, are responsible for rheumatic heart lesions in man. This vexed question must still be considered as undecided.

In *acute cases of septic endocarditis* the nature of the infection calls for no special comment. Positive blood cultures are forthcoming in nearly all cases, and, as already remarked, the micro-organisms are of a highly virulent type.

Until the rôle of the streptococcus in acute rheumatism is more clearly defined, whether, for example, it is the primary cause or only present in the disease as a secondary infection, we cannot profitably discuss the question if some of the cases of *chronic septic endocarditis* may not be justly regarded as cases of "malignant rheumatism." Such a conception is only rendered probable by assuming, with Poynton, that the rheumococcus remains latent in the endocardium for, it may be, many years. This seems less probable than that the disease is the result of a new infection grafted upon the old damaged valve, and this view is the one most generally accepted at present.

Positive blood cultures in the chronic cases are, as already mentioned, by no means invariable. In my early series of mixed acute and chronic cases I found micro-organisms in the blood in nearly 90 per cent. of cases at some stage of the disease. Libman gives the same figure for his cases. But in a second recent series of 162 cases at St. Bartholomew's Hospital the number of positive blood cultures was only 47 per cent. This was largely due to the inclusion in the series of a much larger proportion of chronic cases, and especially of 20 ex-Service cases; in these 20 cases the number of positive blood cultures was only 30 per cent. This paucity of positive cultures in the ex-Service class corresponds with the experience of other observers. The micro-organisms found in these cultures are almost entirely streptococci; the exception is the strange one of Pfeiffer's bacillus, which crops up with extraordinary constancy in the series of all observers provided the number of cases in any series be not too small.

There seems little reason to doubt that the cocci recovered from the circulation during life, and also those isolated from the diseased endocardium after death, by various observers have been of the same type, though called by different names. The difference in names has depended upon the different principles adopted in the segregation of the streptococcus and pneumococcus groups. My original description of these cocci was based upon Gordon's well-known work, in which the morphological and cultural characters of these micro-organisms were supplemented by biochemical reactions in various sugars. Working in conjunction with Andrewes we were able to trace very close affinities between the streptococci associated with chronic septic endocarditis and the salivary and fæcal types as differentiated by Gordon. Schottmüller's nomenclature was based largely upon the fact that these streptococci reacted in a special manner on blood-agar plates; hence his term *Strep. viridans.* Rosenow, on grounds which need not be entered upon here, claimed to have obtained evidence that these comparatively non-virulent cocci are modified pneumococci, and that by frequent passage through animals, and by special anaerobic cultural methods, they could be converted into micro-organisms indistinguishable from pneumococci and possessed of considerable pathogenicity. I am unaware that this work of Rosenow's has been confirmed. Libman is content to term the coccus most commonly found in chronic septic

endocarditis *Strep. endocarditidis*. But when we consider questions of pathogenesis it is obvious that the nature and origin of these streptococci become matters of great importance. Too much attention cannot, therefore, be paid by bacteriologists to the life-history of these cocci and to their probable source.

This is, perhaps, a convenient place in which to refer to Libman's views upon what he terms the "bacteria-free stage" of chronic septic endocarditis. I have already confessed my inability to accept Libman's concept of the disease we are now considering as being a "subacute" rather than a "chronic" process. I gather that others have the same difficulty. I find that the last edition of Osler and McCrae's text-book of medicine includes two separate paragraphs; one is headed "subacute bacterial endocarditis" and the other, immediately following it, is headed "chronic infective endocarditis." But Libman makes it clear that by introducing the term "subacute bacterial endocarditis" he intends it to supersede the older name of "chronic infective endocarditis," and to include the cases formerly put into this category. I must now confess to another inability to follow Libman when he uses the term "bacteria-free stage" of the disease as being synonymous with "healed stage." This writer speaks frequently of "healed and healing cases" in one and the same term. Now I can understand a "healed" case; there seems no doubt, largely as the result of Libman's own observations, that cases of septic endocarditis do occasionally undergo spontaneous cure, and that the residues of the old infection are found post mortem. I can also understand a "healing" case; in many chronic infections we get evidence, both during life and after death, that the lesions show constructive, as well as destructive, changes; to mention only pulmonary tuberculosis as one example. But to group "healed and healing cases" together under this single term seems to suggest some new type of case the criteria of which have been made by no means clear.

Libman admits that in the so-called "bacteria-free stage" of the disease some degree of pyrexia is often present, that anæmia is marked, that embolism goes on, that Osler's nodes and petechiæ appear, that the patients get progressively more and more toxic and eventually die. But is not this passage from a more active stage of the disease to a more passive stage exactly what we see in some, indeed, in a good many, other chronic infections? In chronic pulmonary tuberculosis, again; in lymphadenoma; in chronic *Staphylococcus aureus* pyæmia; in syphilis; in malaria. In chronic septic endocarditis, as in these other diseases, patients not infrequently reach a cachectic stage in which the infection peters out, as it were, at the same time as the patient. The fight has been to a finish and neither party has won. Actually, the micro-organism has won, but only just. It can generally be demonstrated, though perhaps with difficulty, dug in and out of sight. And Libman admits this fact. I instance *S. aureus* infections of a chronic kind in particular as giving us a somewhat similar picture to that which is sometimes seen in chronic septic endocarditis. After a long and tedious illness the patient, cachectic, wasted, anæmic, enfeebled by his prolonged toxæmia, dies exhausted. Blood cultures have been sterile for weeks, even months, and the temperature has been at a much lower level than formerly. At first we were jubilant when these things happened. But they availed nothing, and we became aware that though the fire of the interaction burned much lower the disease was still progressing. We make a post-mortem examination, perhaps; there is no obvious lesion; then, tucked away in some remote corner, we find a collection of inspissated pus—in the sheath of the psoas muscle, perhaps, or in the centrum ovale of the brain. From these old, but still smouldering, foci *S. aureus* is recovered in scanty numbers.

We must, of course, distinguish these so-called "bacteria-free" cases from the periods occurring earlier in the disease during which blood cultures are oft-times negative, yet the patient is obviously in an active stage of his infection. There are possible reasons for these times of relative, or perhaps absolute, a-bacteriæmia. (1) They may be due to the covering over of the colonised bacteria in the valve cusps by a layer of fibrinous material which, for the time being, prevents the paying out of cocci into the blood stream. (2) Or they may be the result of a rise in the bactericidal or other immunising antibodies in the blood, so that the circulation is rendered sterile within the limits of the amount of blood taken for purposes of the culture. Doubtless, there are other causes which are as yet hidden from us. Mervyn Gordon has raised the question whether there may not be some filtering mechanism at work; he also reminds us of the great tendency of bacteria to yield to gravity. I should like to add the suggestion that in these cases something akin to the process of centrifugalisation may go on, by which the bacteria, which are thrown into the circulation, are sedimented in various peripheral organs, leaving the blood stream relatively free. A close study of the cases makes it more and more apparent how innumerable are the embolic events that take place and, therefore, how consonant with actual facts such a hypothesis may be.

DIAGNOSIS.

As the result of my earlier experience I was led to the view that to establish a diagnosis four cardinal points were necessary: multiple embolism, the signs of endocarditis, the isolation of a micro-organism from the blood, and pyrexia. Now that we are more familiar with the clinical picture, and have added certain other well-recognised signs, the diagnosis becomes highly probable, though perhaps never quite certain, without the third and certainly without the fourth of these features. Thus, signs of multiple embolism, with endocarditis, in a patient having clubbed fingers and an otherwise unexplained anæmia, constitute a syndrome which scarcely admits of any other conclusion. In arriving at a decision, however, it is well to remember what a very grave prognosis a positive diagnosis carries with it in the present state of our ignorance of effective treatment. No doubt we shall be able, in years to come, to detect the disease at an earlier stage of its course, in which case we must be satisfied with less severe criteria. It may even be desirable to treat many patients as suspects, and remain uncertain, in the event of a satisfactory issue, if they were, or were not, larval instances of the disease. In other words, we must strive to anticipate rather than merely to recognise, when present, the fully-developed picture. There are other very suspicious combinations of signs and symptoms than that just given, but granted that neither pyrexia nor a positive blood culture is essential to the diagnosis it is impossible at present to construct a syndrome that does not include the feature of multiple embolism. And it is questionable if, once this process is in operation, we are not already too late in our efforts to arrest the disease.

We do not know, unfortunately, if there is an early apyrexial stage in the disease. We certainly do know that, though every case is probably at some time in its course pyrexial, apyrexial periods of one, two, or even three weeks are by no means uncommon during the later stages. Starling tells of an extraordinary instance of prolonged apyrexia lasting 17 weeks. It is clear, therefore, that the absence of pyrexia at any particular time of observation by no means excludes the diagnosis.

Be the significance of negative blood cultures what it may, it is agreed that the diagnosis can frequently be made without evidence of bacteriæmia at the time of examination, and, indeed, even though one or more subsequent efforts are also negative. Libman has described localised tenderness over the lower end of the sternum with light pressure as a common symptom. I have found this present in several cases, but since I have also found it to be not uncommon in cases of severe anæmia, without evidence of endocarditis, I conclude that its importance in diagnosis

depends upon the absence of this latter condition. Such tenderness is sometimes very marked and very localised in Addisonian anæmia.

We are beginning to see light on the clinical side, and also on the side of gross morbid anatomy, in relation to the earlier stages of the disease, and this light may soon help in the histological and bacteriological sides by suggesting new lines of research. Several authors have described cases of mild bacteriæmia, the cocci being of the same type as those associated with chronic septic endocarditis, and in which the clinical analogies with this latter disease are such as to suggest they may have been abortive cases of it. Some of the cases have been followed for a period sufficiently long to make sure that they have recovered. It is tempting to consider them instances in which, as it were, the disease, as we usually know it, has missed fire.

Recurrence.

Cases of recurrence, too, are being brought to light. I have seen two such cases. In one of these I was very doubtful, when the patient first came under observation, if I was not dealing with a case of septic endocarditis. There were signs of aortic regurgitation, and the patient was admitted to hospital on account of mild pyrexia, purpura, and arthritis. The spleen was palpable. Blood cultures were negative. The man was an ex-soldier with no history of any cause for his valvular disease. After two months' observation he was discharged, being given the benefit of the doubt. He worked continuously as a postman for 12 months, feeling quite well. He was then admitted again to hospital, pyrexia and joint pains of an erratic kind having returned. The diagnosis of chronic septic endocarditis did not now admit of any doubt. In the other case there was again a clear interval of 12 months of good health between an attack of right hemiparesis associated with mitral regurgitation, slight pyrexia, clubbed fingers, and anæmia, and a second admission on account of a left hemiplegia, which was followed a month later by cerebral hæmorrhage.

It is possible, of course, that in neither of these cases was the interval between the two periods of observation sufficiently long to exclude the question of very protracted infection with unusually long remissions. But Libman and others have reported cases in which the interval between the attacks has been much longer. So that, unless we again take the view that the coccus can lie dormant in the endocardium over a period of years, we must consider the cases as true reinfections.

PATHOGENESIS.

When we turn to questions of pathogenesis we are faced with a whole series of unknown factors. We seem to know a good deal about the mechanism of the disease once the endocardial infection is established, and even our knowledge of the associated bacteria is by no means small, but the initial phases in the process of endocardial colonisation are still hidden. We assume, perhaps rather too readily, that the source of the invading and infecting bacteria is one or other of the areas which for convenience we term areas of "focal sepsis." Such areas are conceived of as portals of entry of bacteria into the circulation. These areas have been recorded in many cases of the disease as though the relation between them and the heart infection were actually proved. Blumer has collected these records. It does not surprise us to read that the teeth and the tonsils head the list, that the female generative organs come next, and that the bronchial tract follows. But between the very common finding of salivary streptococci in apical tooth abscesses and the relatively uncommon finding of salivary streptococci in the endocardium there is a wide gulf to bridge. With the whole alimentary tract teeming with streptococci of this and of allied types, it is quite a question if the area of focal sepsis is more than an epiphenomenon in the process of deep-seated infection.

Mechanism of Invasion of Valves.

If we now consider the mechanism of invasion of the infected valve we are equally in the dark. Does the coccus invade the valve from the coronary route or from the general blood stream bathing the outside of the valve? The argument for and against both routes, though old, is still open. Carey Coombs has quite recently convinced himself that, whereas the rheumatic virus reaches the cusps, and produces a valvulitis from within these structures, the bacteria in septic endocarditis attack them from the blood circulating around the cusps. The author's important work in connexion with the endocarditis of swine erysipelas is adduced in support of his views. But we still lack adequate demonstration of this difference of the modes of invasion in the two diseases. Whereas some authors adduce the fact of extravascularisation resulting from old inflammation as evidence that the coronary route is the likely one in septic endocarditis, others consider the scarring of the tissues resulting from the same process as liable to favour invasion from the surface. Certainly, if analogy elsewhere goes for anything, it seems more likely that scarred tissues in this situation would be invaded from the surface rather than from the depths. But this latter hypothesis presupposes an initial septicæmia, or at any rate a bacteriæmia, and probably of a massive kind. Of this there does not seem to be any clinical evidence; the disease is very insidious in its onset in nearly every case. Moreover, we are now faced with a difficulty with which the war cases have for the first time familiarised us—namely, that in many of these cases there appears to have been no old valve injury, or none the existence of which was apparent. Yet when we recollect that it is in the hearts which possess minor valve injuries, and not in those in which the valves are seriously damaged, that by preference the disease develops, we must pause before we conclude that the aortic cusps in these ex-soldiers were above suspicion. In this connexion are to be considered the remarks already made concerning congenital defects, such as fusion of cusps, and the effects of strain upon such mechanically handicapped structures. It is rather a terrible thought, and yet it may well be true, that starting life with two aortic cusps instead of three determines a man's ultimate downfall by means of slow but inevitable sepsis, be the conditions of his life what they may. There are many persons in the possession of relatively good health who have minor degrees of valvular disease with good myocardial tone. Is there any way of ascertaining which of these are to be regarded as candidates for endocardial infection? At present the answer is that there is no such way. It is a point worthy of consideration, for if some observations arose by which such predisposition may be recognised this would be a matter of great importance.

But if we are still much in the dark concerning the mechanism of the valve invasion and colonisation, we are still more in the dark as to why it is that such feebly virulent bacteria gain so firm a foothold and pursue such relentless warfare. Is it mainly the general resistance that is at fault, or is it mainly the local tissue resistance? Does the coccus succeed in immunising itself against the natural protecting substances of the blood and tissues? These are some of the questions that still await our answers. To which may be added the fact that the process of chronic ulceration in general in the body still holds some mysteries we have never yet explained.

Is Septic Endocarditis a Specific Disease?

I have spoken of one great contrast between rheumatic endocarditis and septic endocarditis—namely, the great tendency to early and considerable involvement of the heart in the former and the great freedom from intrinsic disease of the heart in the latter condition. I now turn to another great difference between these two diseases. In rheumatic heart disease we feel convinced that we are dealing with the work of a specific agent, and this conviction is not shaken by some doubt as to the causative nature of the infecting agent in certain cases of mitral stenosis. In septic endocarditis, on the other hand, we appear not to be dealing with a specific disease at all—that is,

if we are right in our conclusions that the micro-organisms found to be associated with the disease during life and in the post-mortem room represent the only infecting agents present. I say this because, although I do not know that anyone has advanced evidence for such a view, it is just possible that all the bacteria associated with the pyæmic state in which the endocardium and various peripheral organs are concerned are of the nature of secondary infections, the primary infection being as yet unknown and hardly suspected. But if we assume that the micro-organisms that we deal with every day in the disease are the sole causes of the infection, then we are faced with this striking fact—that the same disease picture may be produced by a variety of different micro-organisms. Even if it be argued that Rosenow's conclusions relative to the association of pneumococci with the disease are not yet accepted, and that the gonococcus cases are not really chronic (though two patients in Thayer's series lived over six months), there still remain, in addition to the streptococcal cases which bulk so largely in the whole number, the cases due to Pfeiffer's bacillus. Between these last-named cases and those due to streptococci there cannot, so far as I know, be distinguished any difference either clinically or by naked eye morbid anatomy. And yet we know of no affinities whatever between the streptococcal group of micro-organisms and the group of which *B. pfeiffer* is a prominent member. But the lack of specificity in the disease would appear to go further than this. Individual cases within the streptococcal group show a strange lack of uniformity when investigated serologically. Kenneth Stone, working in Gordon's laboratory upon complement-fixation in streptococcal infections, found that the serum from cases of chronic septic endocarditis gave positive reactions with the homologous cocci obtained by blood culture, with a titre even as high as 1 : 4800, but that this same serum gave very little cross fixation with heterologous cocci (that is, with cocci obtained from other cases), and frequently no cross fixation occurred at all. It would almost appear, therefore, as though the cases, far from being specific as a group, are specific only as individuals. The bearing of all this upon the difficulties of immune therapy is obvious.

There is still, it seems to me, another striking fact in connexion with the bacteriology of the disease, and that is the absence of any evidence that more than one strain of streptococcus is present in the same case. Nor has any case yet been described in which streptococci and Pfeiffer's bacillus have both been present. If the source of the endocardial infection is an area of focal sepsis, as is commonly supposed, it seems strange that there should not occur in the vegetations and in the circulation, at least occasionally, more than one strain of these common invaders. That this is so strongly favours the view that the streptococci are not performing the rôle of secondary, but of primary, infections.

TREATMENT.

I shall not stay to deal with the treatment in cases of syphilitic disease. In rheumatic endocarditis the treatment is that of acute and recurring rheumatism. Into this again I shall not go, reserving my time rather for considerations that apply to septic cases. When faced with a case of acute infective endocarditis the treatment is that of the septic focus, when this is present, and also of the pyæmia complicating it. Immunotherapy has, perhaps, a slightly better chance of rendering assistance here than it has in chronic cases; it should, therefore, be given a thorough trial. The vogue at present is the process known as immuno-transfusion, and it is, perhaps, too early yet to say what the results of this method are. All cases should, wherever practicable, be treated in the open air.

I now turn to the treatment of the chronic type of septic endocarditis.

Prophylactic Measures.

In one of his most recent communications Libman is good enough to credit me with being the first to emphasise the importance of *prophylactic measures* in the treatment of this disease. Although there is no doubt he is correct in this, he is kind enough not to point out the paucity of the constructive suggestions which I made under this heading in 1909. I dealt almost entirely with the importance of treating the various forms of oral sepsis, and with considering certain methods by which the streptococci of the intestinal tract might be kept from transgressing the barriers which usually suffice to keep them outside the blood stream. That these measures of preventive treatment are of more importance in patients who have residual endocardial lesions, of whatever origin, than in other persons will scarcely be questioned. Yet it is by no means an uncommon experience to find devitalised teeth with demonstrable apical sepsis in these patients. The well-established sequence of a septic endocarditis arising as a direct consequence of the extraction of such teeth under local anæsthesia, together with the isolation of a salivary type of streptococcus from the blood in such cases, should surely lead to a rule of treatment by the observance of which no dead teeth and no obvious pyorrhœa are permitted to be present in such patients. It is unfortunate that a recent obsession in regard to sacrificing all teeth that are in the least degree suspicious in every patient has militated in the public mind against such a preventive measure being followed in selected cases. The question of septic tonsils is much less simple, because the criteria by which we judge these organs are notoriously vague, whether we consider the matter from the point of view of the general physician, the throat specialist, or the bacteriologist. Tonsils are sometimes condemned because cultures taken from them grow streptococci of the hæmolytic, long-chained, or pyogenes type, on the ground that this is a more highly pathogenic type than others. But it is obvious, from what has been said, that in the present connexion such a finding should not condemn the tonsils any more than if the cultures yielded the viridans, short-chained, or salivary type; if, indeed, the condemnation should be as strong. The present state of our knowledge of the streptococcus group makes the statement so often occurring in bacteriological reports, that "cultures from the tonsils give no pathogenic strains of streptococci" of no service when we are considering the prophylactic treatment of endocarditis. Until we have more definite guidance along these lines we shall probably act most wisely by deciding the question of the enucleation of tonsils on their general merits rather than upon their bacteriological content.

In the direction of "intestinal disinfection," so-called, prophylaxis gropes in even greater darkness. There are problems here which we have scarcely begun to probe, but to think that security from subinfection lies in merely avoiding constipation, good though such advice may be, is to invite a rude awakening. We do not even know for certain that subinfection from the bowel bears any definite relation to the quantitative content of streptococci in this situation, or to the relative proportions of streptococci to coliform bacilli, though both of these things are generally taken for granted. Is it not a fact that we not infrequently make use of these and analogous findings to support a scheme of therapeutics, when the premises upon which such a scheme is based are quite lacking in proof? The suggestion of Besredka and others, that it might be well to employ antigens by the intestinal route in cases in which it is presumed that the initial interaction resulting from infection takes place in this situation has scarcely received so thorough a trial as it deserves. We may get some help from such a trial. We may also get some help from well-controlled observations relative to the effect of different diets upon the intestinal flora. Up till now very little work has been done on this point.

The injunction against undue strain, both physical and emotional, in persons having evidence of slight valvular defects, though indicated theoretically, is

not likely to carry much weight. Yet it becomes our duty to give such advice in view of all the facts.

Curative Measures.

Curative measures now call for consideration. *Chemotherapy*, despite the enormous number of drugs that have been tried at one time or another and which I will not stay to catalogue, has so far been of little real help. And this is true by whatever route the drugs have been used. Yet it must not be concluded that we shall not ultimately find some remedy of a chemical nature which shall assist the tissues in their interaction with the infecting agent; for the crude notion that a chemical remedy can only help in microbic infections by a direct bactericidal action is, of course, no longer tenable. Of late years new claims have been made on behalf of arsenic, and especially when given intravenously. Needless to say, when the arsenobenzol series of drugs arrived they were given full trial in septic endocarditis, but, so far as I can find, without any permanently good results. Of immediately serious results by way of cerebral embolus I saw not a few, and I gather this is the experience of others. I have given Capps's sodium-cacodylate treatment a very thorough trial, but have so far seen nothing to lead me to the conclusion that the patient has benefited more than is usual with so good a hæmatinic remedy as this proves to be in many infections. Capps gives daily injections of the drug intravenously, beginning with 1 gr. and increasing gradually up to 5 gr. In all I have treated 12 cases, and I have in half of these given larger doses than Capps has recommended. I have also, following Capps's suggestion, followed up the treatment for many weeks. There is certainly this to be said for the drug, that it is singularly free from ill-effects.

I think it is clear, from all we know of the disease, that recovery, whether by the aid of remedies used or occurring spontaneously, must of necessity be very slow if it is to be safe. When we remember the characters of the vegetations, and the ease with which they separate off as emboli it is obvious that any remedy which acted as quickly as, for example, a grand lavage of the blood stream by some reputed blood antiseptic, would endanger death from cerebral embolism. And when we recollect the deep colonisation of the infecting micro-organisms in the valves, it is equally obvious that no such lavage is likely to dislodge or kill these, seeing they are to a large extent outside the direct blood stream.

As little credit can be given so far to measures of *immunotherapy* as to those of chemotherapy. And this applies to all the permutations and combinations of antigen and immune serum that the mind of the immunologist—not a mind lacking in fertility and inventiveness—has so far devised. The latest of these is immuno-transfusion, which, though it is claimed that this method raises the bactericidal power of the blood, has not so far been more successful than other methods. A method of treatment which raises the bactericidal power of the blood as tested outside the body gives us no guarantee that it will do this inside the body; or, if it does, that the rise in bactericidal power will be sufficient, within the limits of the method, to turn the scale against the infecting agent and in favour of the patient. These things would be very puzzling did we not know of stranger facts. The fact, for example, that, apart from any immune therapy whatever, the blood in many cases of chronic septic endocarditis is extremely rich in certain antibodies specific to the micro-organism isolated from the patient's circulation. And yet such patients may, all the time, be losing ground slowly but surely.

In opening a discussion upon chronic septic endocarditis at Cambridge in 1920, when speaking of curative treatment, I raised the point as to whether we ought not to deal with these patients on much the same lines as we follow in cases of chronic tuberculosis, bearing in mind, of course, the difference in the organs affected. I have of late years concentrated more and more upon non-specific measures as for a disease of "low resistance." I treat as many cases as possible in the open air, with sunlight, natural and artificial. I supplement this by a long series of intravenous and intramuscular injections of sodium cacodylate. Sometimes I have found, as others have, that simple transfusions of blood are of considerable help. These are the only measures I yet know of that seem to give the patients the best chance of overcoming their usually intractable infection.

It remains for me to thank you, Sir, and the Fellows, for your patience in giving me your attention during the delivery of these lectures.

THE SERUM TREATMENT OF DIPHTHERIA.

Being a Paper read before the Fever Hospital Medical Service Group of the Society of Medical Officers of Health on Jan. 22nd, 1926,

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IT is just over 30 years since antitoxin was discovered for the treatment of diphtheria, and it may be of interest to take a brief review of the results obtained with it and the progress which has been made in our methods of administration. For the first few years after its introduction in 1894 the serum used was often of uncertain strength and the dosage, according to our present standard, was very small; but in spite of this the results obtained were very definite, as shown by the improvement of patients after injection and the marked decrease in the case mortality. Physicians all over the world were soon impressed with the value of antitoxin, and its wide employment quickly revolutionised the former methods of treatment, especially the application of strong antiseptics to the local lesion, a procedure which, as now realised, must often have done more harm than good. The results obtained in those early years were sufficiently marked to convince the majority of physicians that in antitoxin we possessed a specific by which it was hoped diphtheria would soon be robbed of most of its terrors as a dangerous disease.

However, after 30 years' experience, during which antitoxin has been extensively used, we find that diphtheria still causes a large number of deaths in this country every year. And in comparing the deaths in 1924 with the number registered from the disease in 1871 we find that the decrease has been very small. Also, if we compare diphtheria in this respect with scarlet fever and typhoid fever, we find that during the past 54 years a much more marked and progressive fall has occurred in the annual deaths from these two diseases than from diphtheria. These figures are given in Table I.,[1] an examination of which shows

TABLE I.—*Deaths from Diphtheria, Scarlet Fever, and Typhoid Fever since 1871.*

Year.	Diphtheria.	Scarlet fever.	Typhoid fever.	Year.	Diphtheria.	Scarlet fever.	Typhoid fever.
1871–1880*	2,943	17,423	7,842	1911–1920*	5,058	1,706	1,278
1881–1890*	4,473	9,177	5,401	1920	5,648	1,430	537
1891–1900*	8,067	4,829	5,340	1921	4,772	1,305	613
1901–1910*	6,092	3,608	3,097	1922	4,075	1,382	465
				1923	2,722	993	450
				1924	2,501	888	496

* Average.

that a continuous fall occurred in the mortality from scarlet fever and typhoid fever from the decennial period 1871–80, whereas the number of deaths from

[1] Annual Reports of Chief Medical Officer of Ministry of Health for 1924, 1919, 1920.

diphtheria increased and reached a maximum during 1891–1900—the period during which antitoxin was introduced.

Comparison of this nature, however, is not a fair criticism of the value of antitoxin. We know that scarlet fever has become much milder in type of late years and that the prevalence of typhoid fever has greatly diminished, and these factors mainly account for the diminished death-rate from these two diseases. A better idea of the value of antitoxin is obtained by comparing the case mortality of these diseases, and in Table II.[1] I have shown the notifications for the

TABLE II.—*Number of Notifications (N.) and Case Mortality (C.M.) of Diphtheria, Scarlet Fever, and Typhoid Fever since 1911.*

Year.	Diphtheria.		Scarlet fever.		Typhoid fever.	
	N.	C.M.	N.	C.M.	N.	C.M.
1911	47,802	10·24	104,651	1·80	13,852	17·54
1912	44,754	9·58	107,508	1·85	8,386	19·16
1913	50,903	8·72	130,707	1·60	8,263	18·21
1914	59,357	9·84	165,045	1·72	8,445	20·30
1915	53,597	10·92	127,086	1·89	6,364	21·81
1916	51,707	10·36	75,722	1·82	5,564	20·16
1917	43,315	10·32	48,871	1·57	4,601	21·23
1918	43,713	10·97	48,180	2·11	4,306	22·06
1919	53,918	9·05	82,398	1·48	3,447	16·73
1920	69,481	8·11	119,490	1·19	3,109	17·27
1921	66,506	7·17	137,073	0·95	3,835	15·98
1922	52,153	7·81	108,242	1·27	2,414	19·42
1923	40,009	6·80	85,603	1·16	3,211	14·01
1924	41,980	5·95	84,654	1·04	4,121	12·03

Case mortality rate calculated per 100 notifications.

past 14 years with the case mortality of the three diseases calculated per 100 notifications. From this it will be seen that the notifications of diphtheria have not varied much during the past 14 years, but the case mortality shows a much greater fall than has occurred with the other two diseases.

It is a matter of no little difficulty to prove scientifically that antitoxin is a specific cure for diphtheria, as the fall in mortality rate since its introduction may be due to some extent to other factors, such, for example, as have led to the diminished death-rate from scarlet fever and typhoid fever. There are still a few medical men who do not consider the injection of antitoxin to be proper treatment for diphtheria, but their number is so small they can be disregarded.

There are also some who attribute the success of the treatment to the serum itself and not to any specific antitoxin contained in it. Claims have been made that equally good results[2] can be obtained with normal horse serum. A possible explanation of this view is that normal horse serum appears to have a stimulating action in some toxic and septic cases, and it is said to encourage phagocytosis. In this connexion I should like to say that in a number of cases which have been admitted to hospital as diphtheria but proved to be septic throats I have often noticed that the condition cleared up very rapidly after an injection of antitoxic serum, and I have been informed by several medical practitioners that in their experience serum injection appeared to clear up septic throats very rapidly.

There is, however, no proof that normal serum can take the place of antitoxic serum in the treatment of diphtheria. As regards the specificity of antitoxic serum, there is fortunately a sufficient mass of evidence available for one to affirm that it is of the utmost value in the treatment of diphtheria and should be administered to every case except perhaps the mildest. One item of this evidence which statistics prove is that antitoxin is of the greatest value when given early in the disease and that its efficacy diminishes with every day of delay in its administration. It can, I think, be safely stated that if all cases could be given an adequate amount of serum on the first day of disease the mortality would be reduced to nil.

Severity and Dosage.

There is universal agreement about the importance of early treatment, but as to what constitutes an adequate amount of serum for any given case is a question on which there is still great diversity of opinion even among experts who have had many years experience of the treatment. One of the chief reasons for this is the absence of any definite sign or symptom by which one can be guided with any degree of certainty in estimating dosage. The amounts recommended in the literature for the different types of case are what individuals have found from experience to be sufficient. Unfortunately, however, the disease appears to vary in prevalence and in severity in different countries, in different areas of a country, and at different periods in the same area. Thus a scale of dosage which might be sufficient for the type of case prevalent, say, in the North of England, might not be adequate for the type prevalent in London. Table III.[1] shows the prevalence of diphtheria in

TABLE III.—*Notifications of Diphtheria in the Years 1911–20. Rates per million.*

Year.	London	Southern Co.	E. and Mid. Co.	N.W. Co.	Northern Co.	Wales.	England and Wales.
1911	1637	1338	1267	1071	1423	1302	1324
1912	1572	1491	1125	961	1213	1268	1239
1913	1696	1552	1328	1104	1435	1404	1392
1914	2018	1686	1634	1177	1535	1540	1592
1915	2110	1679	1469	1136	1418	1428	1514
1916	2063	1456	1526	1261	1366	1349	1428
1917	2059	1308	1295	1105	1042	895	1284
1918	2068	1302	1245	1247	1096	965	1305
1919	2181	1471	1475	1265	1410	1207	1496
1920	3052	1836	1834	1341	1525	1939	1857

different parts of England and Wales during the period 1911–20. From this it will be seen that the disease became more prevalent in London during the latter half of that period than in any other part of the country, and possibly also may have been of a more severe type.

It is agreed among most experts that the size of the dose should be determined by the severity of the case irrespective of the age of the patient, and for this purpose the cases can be conveniently classified into mild, moderate, severe, and very severe. But here again individuals differ as to what constitutes a moderate or severe case. It is commonly stated that the amount of membrane present is the best guide to severity. This, however, is a variable feature. In very severe cases there is often so much swelling of the surrounding tissues that little or no membrane is visible, and when the posterior nares are involved it is impossible to see how much membrane is present. A better indication of severity in faucial cases is obtained from the extent of the tissue swelling, enlargement of the cervical glands, œdema of the neck, presence or absence of nasal discharge, and the appearance of the patient—i.e., whether he looks toxic or not.

The day of disease has also to be taken into consideration and the dose should be liberal for "late" cases; but beyond this the duration of the disease is not of very much assistance in the matter solely of estimating dosage. It is well known that in very severe cases coming late under treatment little or no benefit is often obtained even with a massive dose of antitoxin. Mild cases, on the other hand, usually only require a moderate amount of serum even though the disease has been of several days' duration. Thus the size of the dose should be gauged almost entirely by the severity of the case at the time it comes under treatment.

At this stage it may be convenient to refer to the scale of dosage recommended by four well-known authorities—viz., Park [2] (New York), the late Dr.

[2] Diphtheria, Medical Research Council, 1923, pp. 166, 258, 259.

Ker[3] (Edinburgh), Thomson[4] (London), and Madsen[5] (Copenhagen). There is not a very great deal of difference between the scales recommended by Ker and Thomson except that the amounts advocated by Ker are on the average slightly smaller. This might possibly be accounted for by a difference in the type of disease prevalent in Edinburgh and London. Their scales range from 2000 to 50,000 units according to the severity of the case, and this may be taken as fairly representative of the dosage employed in this country. Park, in his scale, draws a distinction between the amounts necessary for children and adults. His maximum for a child under 15 years is 20,000 units, and 50,000 units for an adult. In this respect he differs from most authorities in this country who, on account of the greater fatality of the disease among children, more or less disregard the age of the patient in gauging the dose. Also I doubt if 20,000 units would be considered in this country an adequate amount for a child, say of 5 years, who was suffering from a very severe attack of faucial diphtheria. Madsen, again, differs from the other three authorities in advocating massive doses, over 200,000 units, for the most severe cases. He states that a relatively small amount of serum will suffice to neutralise the toxin circulating in the blood at the time of injection and check later intoxication, but that in order to obtain what he terms a "curative action"—i.e., detach toxin which has loosely combined with the tissues—it is necessary to give huge doses. In support of this claim he shows that after Prof. Bie had commenced to employ massive doses at the Blegdams Hospital the case-mortality was reduced to under 1 per cent., which is very low as compared with the rate in this country.

It is, of course, the very severe cases that furnish the majority of deaths in diphtheria, and the question arises: Can a larger proportion of these be saved by giving massive doses? This, unfortunately, is most difficult to prove. Some cases are admitted periodically to fever hospitals which are so severe and "late" that one feels sure that no amount of antitoxin would save them. In support, however, of the claim for large doses it may, I think, be safely stated that when a patient receives a liberal dose of antitoxin the symptoms subside more rapidly and there is less risk of paralysis than when the amount given has been on a small scale. As is well known, it is difficult to give an overdose of serum, and the only real argument against using large doses is the expense. If, however, economy is exercised in the dosage for mild and moderate cases one, I think, is justified in employing large doses, say in the neighbourhood of 100,000 units, in the hope of saving a number of the most severe cases.

Dosage and Mortality.

I should like here to refer briefly to the scale of dosage employed at Plaistow Hospital and the results. In Table IV. I have shown the number of admissions, deaths, and fatality rate of the diphtheria cases treated since the hospital was opened 30 years ago.

It will be seen that the annual admissions show a more or less steady increase which became more marked during the war. Since then the numbers have remained high. The deaths, on the other hand, show marked fluctuations, the highest number, 82, being reached in 1907, after which there was a drop to 24 in 1913. The numbers rose again during the war and remained high until three years ago, when a marked drop occurred, the lowest figure, 18, being reached last year. The fatality rate also has varied, but shows a continuous fall in the past few years. These fluctuations in the annual number of deaths are to be accounted for mainly, I think, by periodic variations in the type of the disease.

During the past three years, though the disease has remained prevalent, the type has become milder. And I must add that in the areas where it has been most prevalent the public appear to have become more alive to the dangers of diphtheria. In recent years it has become a common practice for parents to bring children with suspicious throat affections direct to the hospital if they have any difficulty in obtaining the service of a general practitioner. The number of cases admitted "late" through neglect of relatives in seeking medical advice has diminished. A few years ago we commenced to examine swabs for the medical

TABLE IV.—*Plaistow Hospital. Admissions, Deaths, and Fatality Rate from Diphtheria during the Past 30 Years.*

Year.	Admis.	Deaths.	Fatality rate.	Year.	Admis.	Deaths	Fatality rate.
1896	114	23	20·17	1911	295	52	17·62
1897	163	21	12·88	1912	291	35	12·02
1898	249	42	16·86	1913	333	24	7·20
1899	309	49	15·85	1914	380	43	11·31
1900	269	36	13·48	1915	403	60	14·88
1901	310	66	21·29	1916	533	64	12·00
1902	431	72	16·70	1917	559	67	11·98
1903	334	48	14·37	1918	464	70	15·08
1904	351	31	8·83	1919	601	57	9·48
1905	438	53	12·10	1920	769	62	8·26
1906	421	70	16·67	1921	560	32	5·71
1907	422	82	19·90	1922	611	40	6·54
1908	373	47	12·60	1923	671	23	3·42
1909	337	35	10·38	1924	713	27	3·78
1910	260	45	17·30	1925	719	18	2·50

Population served by the hospital: 1891, 204,903; 1901, 267,385; 1911, 289,030; 1921, 300,860; 1924, 317,400. The fatality rate is calculated per 100 admissions.

practitioners, but I cannot say that this has affected the mortality from the disease. Two of the deaths last year were indirectly due to swabbing. In these two cases the practitioner swabbed the throat on first seeing the patient, but the swab proved negative, and it was not until about three days later, when the condition became very obvious, that the patient was admitted. I think there is a definite risk that if a practitioner gets into the habit of swabbing all suspicious throats he will soon become unable to diagnose diphtheria from its clinical signs and symptoms.

As regards dosage, up to the year 1914 the general routine dose was 2000–12,000 units, given by subcutaneous injection and repeated up to a maximum of about 40,000 for the most severe cases. In 1914 the intramuscular route was substituted for the subcutaneous, but the scale of dosage remained much about the same until 1920, when the disease increased in prevalence and severity and the maximum was increased to about 80,000 for the most severe cases. Since then our maximum has ranged from 70,000 to over 100,000 units, given partly by intravenous and partly by intramuscular injections. But during the past three years, as the type of disease became milder, our average dose diminished. In 1920–22 it worked out at about 28,000 units, but dropped in 1923 to 19,000 units. In 1924 it was 18,000 units and last year 15,000 units. At the beginning of last year our scale of dosage worked out at 9000 units for mild cases, 20,000 for the moderate, 40,000 for the severe, and 90,000 for the most severe. Last October we reduced this scale to 5000 units for the mild cases, 15,000 for the moderate, and 32,000 for the severe; but we made no change in our maximum for the most severe type. In comparing the results from 200 cases treated with each of these scales we found no appreciable difference in the mild type, but in the moderate and severe cases treated with the small scale the throat lesion did not clear up so rapidly, albuminuria was more common and persisted longer, and the paralysis rate was slightly increased. Our impression has been that the latter scale is the minimum that can be employed with safety.

Methods of Administration.

The routes by which serum has been given have been by mouth and rectum, and by injections subcutaneously, intramuscularly, intravenously, intra-

[3] Ker, C. B.: Infectious Diseases, 1920, p. 431.
[4] Thomson, F. H.: Diagnosis and Treatment of Infectious Diseases, 1924, p. 137.
[5] Madsen, Th.: Journal of State Medicine, March, 1923, p. 101.

peritoneally, and intrathecally. Administration by mouth and rectum has been shown to be practically valueless for therapeutic purposes and should not be employed.[3] Subcutaneous injection was the method most generally used in the early years of serum treatment and it still continues to be the common mode of administration. Its advantages are that it is safe and easy to perform. It has, however, one important disadvantage—namely, that the antitoxin is very slowly absorbed from the subcutaneous tissue.

Intramuscular injection was first employed in this country about the year 1914, and it has now largely superseded the subcutaneous route. Its great advantage over that route is that the antitoxin is absorbed much more rapidly from muscular than from subcutaneous tissue—a very important consideration in severe cases. When the injection is made on the outer side of the thigh, in its middle third, it is quite as easy to perform, quite as safe, and less painful than subcutaneous injection in the abdominal wall. I do not know of any reason why the subcutaneous route should still be employed in preference to the intramuscular. The injection is sometimes made into the gluteal region, but this is a bad site as it is very painful and uncomfortable for the patient, and the puncture wound is liable to be infected.

Intravenous injection has the advantage over the other two routes in that the full effect of the antitoxin is obtained almost immediately. Its disadvantages are that the injection is frequently followed by a severe reaction and that in young children it is sometimes difficult to get the needle into a vein. From my own experience of this method in severe cases I have been impressed by the rapidity with which the toxic symptoms have subsided and by the number of patients who escaped paralysis or only had it slightly. Though the reactions following the injections are sometimes severe, death has been rare and with some practice the injection is not very difficult even in young children. In very severe cases I think an intravenous injection of part of the serum at the outset improves the patient's chance of recovery.

I regret I have had no experience of intraperitoneal and intrathecal injections and can offer no criticism of these two routes.

Regarding the question whether the antitoxin should be given in a single or repeated doses the evidence appears to show that one should aim at giving at the outset of the disease all the antitoxin the patient is likely to require. It has been stated that an insufficient first dose cannot be wholly compensated for by later injections. Some authorities favour repeated injections, and in severe cases it is often difficult to estimate at the outset the exact amount of serum the patient is likely to need.

In recent years brands of highly concentrated sera have been obtainable on the market and it is claimed for these that owing to the small bulk a large amount of serum can be injected more easily and that serum sickness is less likely to be severe than with unconcentrated brands. A highly concentrated serum should be very convenient to the general practitioner, but there does not seem to me to be any necessity for using it in hospital practice. I have found no difference between concentrated and unconcentrated brands in the incidence of serum sickness, and on the whole I prefer the unconcentrated type.

With reinjection of patients who have previously had serum the incidence of anaphylaxis or severe serum sickness is so rare, particularly in children, that the fear of it occurring need not prevent a second injection if the patient requires it. And it also seems unnecessary to give a desensitising dose to children.

Conclusions.

Experience has shown that the value of antitoxin as a specific cure for diphtheria is limited to the early days of the disease—i.e., to the first three or four days from the onset. In order to reduce the case-mortality the first essential is early diagnosis and treatment.

Extensive swabbing of all suspected throats cannot be recommended because it incurs delay and the results are not always reliable. Better results would be obtained if medical practitioners made it a routine habit to inject all suspicious cases with antitoxin at their first visit on the scale recommended by the Ministry of Health.

For the type of case which is virulent from the onset I recommend the administration of large doses of serum partly by intravenous and partly by intramuscular injection.

ON A METHOD OF CANCER RESEARCH.

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THE object of this article is to call attention to a method of research which has proved successful in the solution of some difficult problems of science and, for reasons which will presently be given, seems pre-eminently fitted for the solution of the cancer problem. It affords a strong contrast to methods of research now in vogue. These are inductive and seem to be based on the proposition that despite the possession of an enormous quantity of facts, the accumulation of centuries of observation and experience, we still lack the essential data. For these we search chiefly by experiments on lower animals in laboratories. The method now to be discussed is deductive. By it we assume that we already have facts enough and that we know the biological laws and the principles by means of which we can put them together in the right way in order to gain our end. The two methods are fundamentally different. By the former or inductive method the problem is approached as a locked-up mystery, a sort of Aladdin's cave, to be opened by means of a key, by some formula still to be found. By the deductive method, about to be described, it is regarded as a jig-saw puzzle on the grand scale, not to be solved until every part has been fitted together in its proper place.

Owing to the wonderful success of the experimental method when applied to other departments of medicine, induction is now so much more highly esteemed than deduction that there is reason to fear that its popularity is leading to its use in unsuitable cases. In reality each has its advantages and each should be regarded as complementary, not antagonistic, to the other. At no time has progress in knowledge been so rapid as when the one has gone hand in hand in friendly relations with the other, checking its exaggerations and correcting its mistakes. Hence the present dominance of experiment over experience, of laboratory work over general biological study, is matter for grave apprehension, and the time seems ripe for a general review of the situation and the trial of some wide method of deduction. That this is a reasonable attitude to adopt will, I think, be apparent when we consider the results of present inductive methods of cancer research.

Inductive Methods of Cancer Research.

Search for the nature and cause of cancer has now been going on for well over 100 years. The first cancer research laboratory was established in London in 1802, and during the whole of the nineteenth century cancer was regarded as one of the great scientific problems which pressingly demanded solution. We have reached the poles, have solved the conundrum of flight, have discovered X rays and radium, the telegraph, telephone and wireless telegraphy. But while these and other difficulties of mechanics, exploration, physics, chemistry, transport have been born, have matured, have even become old and effete, that of cancer is still incubating. In our own line of work brilliant discoveries have been made in the domain of diseases due to microbial invasion; but cancer, which has received ten, twenty, even a hundred times more attention still defies all our efforts.

The history of cancer research is a record of gigantic labour, carried on by men of outstanding ability, at enormous expense to end in failure. We ask ourselves what are the causes of this want of success? Evidently it is not the result of any lack of effort or of competence. The more sure we are that the fault does not lie in this direction, the more likely is it that it is due to some mistake in our methods, some error of strategy. Let us now see in what this strategy consists.

At first cancer research was mainly *anatomical*. Cancers, both in the living and in the dead, were studied with great thoroughness, much to the improvement of classification, of diagnosis and of surgical treatment, but with very little result so far as an understanding of their nature and causes was concerned. A fresh impetus was given to this form of examination by the introduction of microscopy; but this extension of anatomy to the finer details of cancer structure, though carried to the point of exhaustion, has also turned out to be barren of the desired results. While searchers were still being exhorted to "think anatomically," fresh discoveries in *bacteriology* by Pasteur started a new and still more hopeful way of investigation. One after another disorders which had hitherto defied all attempts to understand them were now found to be due to invasions by minute forms of vegetable or animal life, and what could seem more likely than that cancer should be of the same category? But little, if any, progress having been made as the result of patient labour in this field of investigation, a third and still more hopeful way was opened by *biological* research. At the end of the last century the growth and behaviour of living cancers began to be studied in the bodies of lower animals. But, unfortunately, this new and encouraging departure is suffering from the prestige of morphology and bacteriology. As applied to cancer research biology is being mercilessly cramped by its association with these other two sciences in a sort of symbiotic trinity within the restricted and stuffy precincts of the laboratory. Nevertheless this third form of research, this offspring of the biologist and the bacteriologist, has already met with some success, though on a small scale, as befits its parentage. For whereas all the previous years of patient labour were barren as far as the main issue is concerned, out of the biological travail of this century has arisen a better knowledge of the living cancer as it occurs in rodents and fowls, and this seems a definite advance on the earlier knowledge of the forms and composition of dead cancers. Yet, as we look at the enormous growth of the cancer research movement and then at these results, we are inevitably reminded of the mountain in labour, for out of it has emerged a mouse bearing upon its back that strange burden, the neoplasm of Jensen. And it is upon this same mouse, this same *ridiculus mus*, that we are largely depending as the means by which the British lion is to be freed from the bonds of cancer.

However much this form of research may appeal to us, it is open to serious, even fatal, objections. If cancer is not the result of an invasion but is in truth a part of the animal it infests, it would evidently be very unsafe first to study the neoplasms of much lower forms of animal life and then to apply our inferences and theories to the neoplasms of human beings. By such study we may add to our knowledge of the growths of plants, of mice or of fowls, but not of men. It cannot too emphatically be asserted that, however ingenious the research made on these lines or shrewd the induction, no reliance can be placed upon it as an explanation of human cancer or of the causes of human cancer until it has been successfully applied to human beings.

The *conclusion* is that though greatly indebted to anatomy for our knowledge of the structure of cancer and for its bearings on treatment, it is of little use as a means of finding causes. Laboratory methods, again, though supremely useful in unravelling the tangled mysteries of the microbial disorders, are unfitted for cancer investigation. They are wrong in principle, seeing that there are cogent reasons for looking upon cancer as of internal origin and fundamentally different from the disorders due to microbial invasion.

Deductive Cancer Research: The Cartesian Method.

We now turn to a form of deductive research advocated by Descartes some 300 years ago. As applied to the present problem it is based on the proposition that cancer of man is essentially an intrinsic disease, a piece of the man himself, and that for its solution we have all the data we require. According to this view the genesis of cancer is an affair of human genetics.

It was the opinion of Descartes that in the end all natural phenomena are mathematical and that provided the facts are sufficient and the laws understood it is possible by sheer calculation to solve any problem of nature or disease. It is in accordance with his system as described in his "Method of Rightly Conducting the Reason and Seeking Truth in the Sciences," that we need not wait until our knowledge of anything has become Euclidian before we begin our calculations. At no time is it more opportune than when a problem has resisted many years of inductive investigation and is buried under a vast mass of facts and theories. The method is, moreover, applicable to problems of disease. Descartes regarded it as eminently fitted for this purpose and thought there could be no higher task than to apply it to the advancement of medical research.

The Cartesian method was almost inevitably both analytic and synthetic, both destructive and constructive. Old, worn-out and dangerous methods and beliefs were of necessity broken down in order to make way for the foundations of a better structure. Its *destructive* or analytic effects were obvious. The wonderful advances in philosophy initiated by Plato and Aristotle which had done so much for the progress of knowledge and had inspired Galen had got into grooves. Science instead of going forward had lost its way and was moving in circles. Such non-progressive movements were not confined to theologists and philosophers, but flourished among the medical fraternity, who were entrenched behind centuries of tradition and were severely intolerant of those who would not adopt their own particular tread-mill methods of working.

It was one of the great merits of the Cartesian method that it tended to break down these time-honoured but costly and obstructive beliefs. Founded on doubt and with the single purpose of getting at the truth, it closely scrutinised even the most tenaciously held theories and practices. Authorities, vested interests, opinions, common beliefs were regarded as nought; nothing mattered except the truth. That a statement had behind it the weight of authority or of precedents was to Descartes the more reason for scepticism. By so winnowing the chaff from the wheat he did much to prepare the way for our present dependence upon rationalism and dislike of dogmatism; and also for the friendliness with which new ideas and new criticisms are now received even by conservative scientists.

So much for the destructive side of Cartesianism. The synthetic or *constructive* side was simplicity itself. In the investigation of any problem of natural science the Cartesian would study the laws and rules by which it is governed and regulated, comparing them with the facts and data. Though he proceeded mainly by deduction, his theories were never so much in advance of his facts as to lose sight of them, and sometimes it is a little difficult to say which were leading, the facts or the theories.

The method appeals not only by the force of its logic, but by its results, for it has often been applied with success. There can be no better example of the successful use of the Cartesian method than the discovery of the planet Neptune by Adams and Leverrier. This represents the use of the method in

its simplest form. So little had the telescope and sleepless nights of actual observation to do with this discovery that, according to Flammarion, Leverrier, 30 years afterwards, had not only never seen Neptune, but would not even trouble to put his eye to a telescope which was being directed to his planet. After the same fashion, to compare the very small with the very big, it is conceivable that an investigator working on the Cartesian plan might answer all the cardinal questions that may be asked about cancer without ever having seen a cancer. An inquiry into the causes and nature of cancer could be carried out by anyone who has the requisite data and sufficient acquaintance with the laws of life, especially with those which deal with origins and go by the name of genetics and with ecology or the science of relations. At the same time, so wide is the scope of such an inquiry that it will be to the advantage of the "researcher" that he should get all the information about the disease that he can. He should be familiar with cancers living in their natural surroundings, or, in other words, should himself be an operating surgeon. In addition, it will be so much the better if he has a private laboratory and the services of a competent assistant that he may know the structure of all sorts of cancers and precancers and allied diseases. To understand the wider aspects of the question at issue he should also have some knowledge of sociology. He should, in short, be a biologist in the largest sense of the word. Lastly, the "researcher," so equipped, and with all the resources of the best of museums and of medical libraries at his disposal, must be prepared to continue his inquiries until he has accomplished his task, although it may occupy his spare time for some 20 or more years.

The Results of a Deductive Cancer Research.

The following is a brief account of some of the results of such a research, details of which have recently been published.[1] It would be impossible within the limits of this article to give even an outline of the many new interpretations of familiar facts of oncology which have thrust themselves forward and compelled attention. But two deserve special mention because of their importance and because they furnish excellent examples of the results of the method.

Nature of Cancer.

1. The first interpretation is concerned with the great central problem of cancer—its ceaseless and useless *proliferation*. By the rational method of Descartes a simple and perfectly adequate answer is found already provided by biologists. Cancer as an intrinsic disorder has its source in the disturbance of some normal attribute of the body. By a process of analysis this is found to be *development*. Von Baer, Huxley, and Ray Lankester have shown that development is coterminous with life and has a progressive and a regressive or degenerative phase. There is first a rise from simplicity to complexity, then a fall from complexity to simplicity. Development, in other words, tends to assume a circular form. If we regard it from the standpoint of the individual it is circular; if from that of the race it is cyclical. In the latter event it marks a forward movement, fresh cycles being given off as the circle turns round. Modifications of this circle of development occur according to the unit of construction. Man as a whole, organs, cells, each has its own circle. The mechanism is one of lesser wheels and bigger wheels.

The development of *man*, as a whole, turns round in its course, so that in its regressive phase we can detect a debased repetition of the progressive phase. We all know the second childhood of man and some of us are familiar with his second infancy. Those who have carefully examined the tissues of old people also become acquainted with changes of an embryonoid character displayed more or less prominently in his various organs.

[1] Tumors and Cancers: A Biological Study. By Hastings Gilford. 1925.

Then each *organ* lives its own life and provides its own circle, some circles being longer or bigger than others. These, too, begin in simplicity, become complex, and end in simplicity. Of the shorter or smaller circles the reproductive organs furnish the best known example.

Then come the *cells*. As a rule, the life-history of the cell is bound up with that of other cells in the organ to which they belong. But, as we all know, occasionally clusters of cells *qua* cells either fail to develop or run through their development too soon. Should they remain stagnant and unprogressive, one of several results may be expected: (1) The clump of cells will be absorbed. (2) It will resume its interrupted development and, if not too backward, will catch up with other cells to become a useful member of the cell community. (3) Or it will be so far behind as to remain permanently ill-developed and out of harmony with the surrounding cells. So truly may this be the case that to all intents it is a piece of tissue from an inferior animal. It will therefore be shut off or encysted. One of three things may happen to this incongruous patch: (*a*) it degenerates molecularly and is absorbed; (*b*) or it renews its progressive growth, but with a wrong chronology and with diminished restraint as a tumour; (*c*) or it enters upon its second childhood and then resumes an embryonoid character, proliferating after a debased fashion as a cancer. Cancers are, indeed, cells which have entered upon the degeneration of old age too soon and are being nourished by the juices and stimulated by the hormones of the younger, more vigorous tissues around them. They are often spoken of as embryonic, as if they were young cells. Cancer cells are not young or progressive, but are senile, regressive, decadent. They are embryonoid, not embryonic, and it is for this reason that they multiply so incessantly and so uselessly.

The importance of this cyclical theory of development in its bearings on pathology is difficult to exaggerate. With this in our minds we should be less inclined to confuse the granulomas or other progressive neoplasms of lower animals with the regressive neoplasms or cancers of man. The difficulties of distinguishing between progressive multiplication and regressive multiplication become greater as we descend in the scale of life, because the lower we go down the scale the smaller the developmental cycle; the more closely the embryonoid approximates to the embryonic. Indeed, in the case of certain neoplasms of plants the likeness to cancer cells may be so close that only the facts that these neoplasms favour young plants and that the plant has no true regressive phase comparable with that of a metazoan animal enable us to distinguish between them.

Causes of Cancer.

2. The second outstanding feature of cancer is the manner in which cancers are brought into being. We all agree that the actual cause of cancer is to be traced to some outside source. This being the case, how can we reconcile this external cause with their internal status? By the Cartesian method we find the explanation in the action of *cancer-producing irritants*. The evidence is now overwhelming that for the production of cancer two factors are essential, the first factor being a passive predisposition possessed by some animals, men, organs, or cells to a higher degree than by others; the second factor a stimulant or irritant capable of rousing the cells into regressive activity. Translated into the language of biology these factors become "variability" on the one part and "suitable environment" on the other.

The Irritant.—It must now be our business to find how the passive predisposition or variability coöperates with the active irritant to start the cell multiplication which is cancer. Attention has often been called to the resemblance of the action of the irritant upon the susceptible cells to produce the proliferation of cancer, and the action of the male cell upon the female cell to produce the proliferation of the embryo.

That this comparison is just, reasonable, and sagacious is shown by the presence of a series of connecting links between the two forms of neoplasms—the embryo and the embryonoid—and between the stimuli by which they are actuated.

(1) Thus in the beginning of the cycle of normal development the proliferating cells which constitute the embryo are the result of the action of three forms of stimuli. There is first the mechanical stimulus of the entrance of the active spermatocyte; then the chemical stimulus of its molecular disintegration; and, most potent of all, a third stimulus, an actinic stimulus, liberated when the one cell acts upon or even approaches the other cell.

(2) But in this act of embryo formation the presence of the sperm cell is by no means essential; for, at any rate in the lower animals, a complete series of progressive developmental changes can be set going by artificial stimuli, by mechanical stimuli alone, by chemical stimuli alone, by actinic stimuli alone.

(3) In the next place strong circumstantial evidence has been brought forward by competent observers tending to indicate that similar parthenogenesis sometimes occurs in human beings, resulting in the formation of imperfect embryos in the ovaries of women or even in the testes of men. Such embryomas lie in the border region between normal embryos and tumours.

(4) The next step is across this border. The embryonic or undeveloped cells which constitute Cohnheim's cell-rests in some ways resemble the reproductive cells in the ovary. They are undeveloped; are clusters of cells set apart from the somatic cells in general; are more susceptible than normal cells to the action of mechanical, chemical, or actinic stimuli; and under the influence of such stimuli are capable of growing rapidly in a progressive if abnormal manner as tumours or regressively as cancers.

(5) The last stage of these gradations is reached when we come to those collections of primitive-looking cells which form pre-senile adenomas or papillomas, such as those which occur in the degenerating female breast. These are groups of cells which have completed their cycle of development before their time and have arrived at a stage of regressive simplicity comparable to that of the progressive simplicity from which they started. They have reverted to a form and function almost on a level with those of the amœba or of the oocyte; and, like all primitive cells, their faculty of reproduction stands out conspicuously as compared with other faculties. All that is necessary for this reproduction to assert itself is the action of an appropriate stimulus in an appropriate strength. Such a stimulus is supplied by trauma or other mechanical agent; by the toxins of some bacterial infection or other chemical agent; by X rays or other actinic agent.

Hence the self-same forms of stimuli, which act at one end of the developmental cycle to start a proliferation of progressive type ending in the formation of the normal human embryo, are capable of acting at the other end of the cycle to produce the embryoma-like proliferation of regressive type we term cancer. Embryos are the tumours of the beginning of development; cancers are the embryomas of the end of development.

It is important to realise that though cancer is the parthenogenetic conception or offspring of aged tissues, it is the child of premature, not of normal senescence. In normal senescence the changes of regression are accomplished so quietly, so unostentatiously, that nothing happens except the gradual substitution of a low order of (connective) tissue for a higher. The weeds begin to flourish as the soil is exhausted and the crops fail. But when local senility sets in before its time and the degenerated cells are aroused into reproductive activity by the violent and repeated action of some appropriate stimulus, it is but to be expected that the resultant growth will be regressive, disorderly, and excessive. And once this embryonoid activity is set going, the comparative youth of the body at large will ensure that it does not fail from lack of support. Nutrients reach it through the blood and lymph streams as well as stimulants from the various endocrine organs. Hence the more youthful or sanguine or vigorous the body as a whole, the more malignant the cancer; and the more aged or shrivelled the body, the slower the growth of the cancer and the more likely to come to a stop.

The Predispositions.

The active stimuli which incite to cancer are not to be compared in importance with the passive element which constitutes the predisposition to cancer. These more subtle causes are intimately connected with the degenerative circumstances of our time. Cancer, as a degeneration, arising in circumstances of degeneration, springs from causes so widespread that we are able clearly to trace their influence in the changing customs of civilisation. Everything which promotes degeneration in general is potentially a predisponent to cancer. If civilisation prolongs life into its senile states, it is a cause of cancer; if it keeps alive the inferior C 3 quality of the nation and enables its degenerate members to grow up and multiply, it promotes mental and bodily deterioration, including cancer. The study of the laws and regulations of biology has given us the assurance that in all living creatures in a state of nature there is a process of elimination at work by means of which the progressive qualities tend automatically to survive and the lower, baser qualities to succumb. Cancer and other degenerative diseases are therefore scarce. In wild life good ultimately rises to the surface and bad falls as a sediment to the bottom. If we deliberately preserve the bad and cultivate a bad stock, while we waste and discourage and eliminate the good, using its superior qualities for the preservation and increase of the bad, we commit a mortal sin against nature by ensuring not the survival of the fit, but of the unfit. By this means decadence prevails and an atmosphere is created congenial to mental and physical deterioration and to the various degenerative diseases.

Inadequate use of highly important organs, such as the reproductive organs of women or the digestive organs of both sexes, must also be regarded as a source of weakness and degeneracy and as rendering these organs vulnerable to cancer-producing agents.

Conclusions.

It is hoped that the rough and inadequate sketch which has now been given of some results of the Cartesian method of research as applied to cancer may convey some idea of its value and may induce others to pursue the same method of investigation. It will be seen that it may correctly be termed the method of the jig-saw puzzle, for by it evidence is collected from all sources to be classified and arranged in accordance with biological laws. Certain facts are correlated and made to dovetail in with other series of facts. Gradually definite patterns begin to emerge out of the original chaos until at last the worker sees before him the whole picture clearly revealed.

This solution, again, is not partial nor indefinite, but is a full and satisfactory reply to each and all of the six cardinal questions which must be answered before we can say we understand the nature and cause of anything. In its complete form it tells us *when* cancer begins; *whence* or in what circumstances it arises; *where* it is placed. These we know already, but by the Cartesian method we are enabled also to answer the far more important questions, *what* cancer is; *how* it begins; *why* we are afflicted with it. These answers, moreover, are not merely dialectical and superficial, each remaining in its own pigeon-hole as a self-contained theory, but are interdependent, bound together in one fascia by the rational method of Descartes.

Cancer we see as a cluster of cells which, owing to over-stimulation and to more diffuse degenerating influences, are finishing their circle of development too soon. Structure and function now approach their

original simplicity and the faculty of reproduction, the most primitive of functions, released from all inhibitions, comes to the fore. Under the fertilising influence of one or more of the reproductive stimuli —actinic, chemic, mechanic—these cells burst forth into an embryonoid or amœboid reproductive activity and find their way along the lines of least resistance to all parts of the body.

TUBERCULOUS ADENITIS TREATED BY RADIUM.

A SERIES OF FIFTY CASES.

BY PHILIP GOSSE, M.D. DURH.,
ASSISTANT MEDICAL SUPERINTENDENT, RADIUM INSTITUTE, LONDON.

ALTHOUGH radium as a therapeutic agent is generally associated with the treatment of cancer, it can be of great use in the treatment of several forms of non-malignant disease. One of these—tuberculous disease of the lymphatic glands—responds very satisfactorily to irradiation with radium plates, and the following series of 50 cases treated at the Radium Institute, London, appears to be worthy of analysis and record.

From a study of the notes of these cases certain facts emerge. In many instances there was but little benefit noticed after the first application of radium, but definite improvement became apparent after the second. Various forms of screening and different lengths of application were tried in the early stages, but it was soon observed that the best effects were to be expected when the treatment was carried out in a long exposure with heavily screened apparatus, given during a 48 hours' stay as an in-patient, although good results were obtained when the patient was treated as an out-patient, with three or four daily sittings of six hours' each, making a total of 18 or 24 hours' exposure. If after a long exposure a second treatment were given, an interval of at least six weeks should be allowed to elapse between the two exposures to radium.

Selection of Cases and Diagnosis.

The cases reported upon here were of all ages, from a few months to comparatively old age. The cases of children did best, but improvement is to be looked for at any age. Those patients who had received previous X ray treatment did not respond to radium so quickly as those who had not.

In most of these cases the question of the removal of the glands by operation had been discussed; and the various reasons for negativing surgical means were as follows: (1) The general physical condition of the patient. (2) Previous operation had been performed but disease had recurred. (3) The objection on the part of the patient, or the parents, to what they believe to be the danger of the operation, but much more commonly to the fear of disfiguring scars remaining in the child's neck afterwards. (4) In the more recent cases the doctor in charge of the case, having had good results in previous cases with radium, preferred to resort to that line of treatment from the first. (5) The operation for removal of tuberculous glands by surgery is now but seldom done.

Every doctor who has sent a case of tuberculous adenitis to be treated here has been written to, and asked for information as to the present condition of his patient, and whenever possible the patient has been re-examined at the Institute. In not a few of these cases which had been previously operated upon, besides the enlargement of the glands, disfigurement and even deformity were present, owing to keloidal changes in the scars. It is satisfactory to note that the same radium application given for the glands will at the same time reduce these keloid scars. When a patient comes for radium treatment, and on examination a swelling is found which contains fluid, this is first removed by aspiration. In those cases where there is a sinus leading down to one or more broken-down, discharging glands, treatment by radium is by no means contra-indicated. In fact, in most of the cases of this kind treated by radium the sinus has rapidly dried up and closed.

Although the diagnosis of tuberculous adenitis was made in a few cases from microscopical examination of gland tissue removed by operation, in most of them the diagnosis was arrived at by the clinical history and physical examination. It is to be noted that where a mass of glands diagnosed as tuberculous suddenly and almost completely disappears within a week or ten days of the first radium application, the case is probably not tuberculous, but proves later on to be lymphadenoma.

It is interesting in going over the notes of these cases to observe how on not a few occasions enlargement of the glands of the neck was first noticed some few weeks after the tonsils had been surgically removed. What the significance of this is, whether merely coincidence, or whether, owing to the removal of the tonsil, bovine tubercle bacilli have gained access through the bed of the tonsil, it is difficult to say, nor is it strictly concerned with the subject under discussion.

Technique and Results.

The technique itself is simple. The glands to be treated, having been carefully located and palpated, are marked out on the overlying skin with a dermographic pencil. Over these localities "half-strength" plates—i.e., plates covered by 2·5 mg. radium element to each 1 sq. cm. surface, and covered by a sheet of Monel metal 0·3 mm. in thickness and screened with silver 1 mm. in thickness—are applied, and held in place by pieces of adhesive plaster. Over these a few turns of crepe bandage are placed. This causes no discomfort to the patient, but where the patient is remaining in the Institute for two days and two nights, the plates are removed occasionally for a few hours.

Of the cases of tuberculous adenitis treated at the Institute I have taken 50 consecutive ones, which show the following results: cured, 37; improved, 9; not improved, 3; dead, 1; total, 50; and these statistics give a very good idea of the results to be expected by treating with radium. The cases reported "cured" represent those in which the patient enjoys perfect health in every way, and has no glands that can be palpated, or at most merely small shotty hard bodies, consisting of fibroid tissue only.

Of the three cases which did not improve, in one the doctor in charge of the patient wrote to say that a week after the child returned to his home after radium treatment the glands swelled up and had to be operated upon, and a quantity of pus was evacuated. Another case, a male, aged 24, died of phthisis three years after the treatment. Such a rare termination of a case of tuberculous glands is worth while recording. In his letter the doctor stated that after the radium treatment the glands entirely disappeared and never returned.

Histology.

The action of the radium on the tuberculous glands has kindly been described for this article by my colleague, Dr. J. C. Mottram, who writes as follows: "The cellular changes which follow the irradiation of tuberculous lymphatic glands finally result in fibrosis. There is an early disappearance of lymphocytes, which either disintegrate or are phagocytosed by macrophages. The lymphoid myeloblasts, except after large doses of radiation, do not perish, and later may re-form lymphocytes. The lymphoid follicles atrophy, only the central cells remain. The endothelial mesh-work of the gland remains little altered, except for a great increase of fibrous tissue, so that the whole gland, shrunken from the loss of lymphocytes and other cells, comes to consist of narrow spaces lined by endothelial cells running

through thick fibrous tissue. In this tissue the tubercles persist, more especially the giant cells, and here tubercle bacilli have been found persisting many months after radiation. It has been concluded from these appearances that the good clinical results are due to the creation of a site unfavourable to the growth of the tubercle bacillus, rather than to any direct action of the radiation on the bacillus. The dose of radiation given is always very much less than the lethal dose for the bacillus; nevertheless, a direct action on the bacillus may also be a factor, for the reason that it is well known that sublethal doses of radiation effect a lowering of the virulence of bacilli."

I am indebted to the many medical practitioners who have written to me in reply to my inquiries about their cases treated at the Institute, and my thanks are also due to Mr. A. E. Hayward Pinch for much helpful advice.

Clinical and Laboratory Notes.

A CASE OF INTUSSUSCEPTION PRESENTING UNUSUAL FEATURES.

BY D. S. FAIRWEATHER, M.B., CH.B. EDIN.,
SENIOR HOUSE SURGEON, BLACKBURN AND EAST LANCASHIRE ROYAL INFIRMARY.

THE following case presents several features of interest.

H. W., a boy of 14, was taken ill suddenly on the morning of Nov. 28th, 1925, with colicky pain across the umbilical region. He vomited a little later, and before admission vomited everything he ate. On the 29th he had diarrhœa, which continued until admission. He stated that no blood was passed per rectum. The pain recurred spasmodically and seemed to spread all over the abdomen. He is said to have swallowed a pin two years ago. Previous health good. The patient has six brothers and two sisters, all healthy.

Condition on Admission.—He was admitted to the infirmary on Dec. 3rd; temperature 100° F., pulse-rate 110, respiration-rate 26. He did not complain of much pain, but looked ill. The abdomen was slightly distended, although there was no visible peristalsis. Generalised abdominal tenderness was present, which seemed more marked in the right iliac fossa. Rigidity was not marked, though definite resistance was made to palpation. A rectal examination was made and a mass situated in the pelvis palpated. The mass seemed to lie slightly more to the left and was very tender. There was no blood on the palpating finger. A diagnosis of abscess from a pelvic appendicitis was made and an operation performed immediately.

Operation.—A right paramedial incision was made. Coils of small intestine were found to be distended, and a mass lying in the pelvis was brought to the operation wound. It was an intussusception involving about 18 inches of small intestine. Attempt at reduction was immediately followed by splitting of the serous coat of bowel and very little of the intestine could be freed. The affected loop was therefore excised and a lateral anastomosis performed. A small drain was inserted as there had been some slight leakage of intestinal contents and the abdomen was closed.

Pathology.—The specimen was examined subsequently and the entering and receiving loops found to be gangrenous in places. No pathological condition could be found to account for the production of the intussusception, although no definite attempt was made to find whether the swallowed pin could have accounted for the condition, as this fact was not disclosed until three weeks afterwards.

Progress and After-treatment.—The patient was given frequent salines subcutaneously, and on the second day following the operation the drain was removed, a little blood-stained discharge persisting for two or three days. His temperature reached 101·2° on the second day after operation, but soon dropped to 99°, and did not again rise. The bowels moved twice on the fourth day after operation without aperient, and have done so normally since. He was discharged on Jan. 4th, 1926, in perfect health.

Unusual features in the case are: (1) the age of the patient; (2) the alleged absence of blood in the fæces; (3) the rather unusual site of the intussusception; (4) the almost uneventful recovery after such an extensive operation and on a patient who had suffered five days before operation.

My thanks are due to Dr. W. Cran Duthie, honorary surgeon to the Blackburn Royal Infirmary, for permission to publish this case.

SKIN-GRAFTING IN ACUTE SYMBLEPHARON.

BY JAMES MOORES BALL, M.D. UNIV. OF IOWA,
MEMBER OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

THE writer is not aware that the method described in this paper has been used previously in the treatment of acute symblepharon; yet, it would be most strange if it had not been employed. In the hope that this note will elicit information on the subject, it is put on record.

Extensive burns by lime rarely come under my observation. A few months ago, however, a young man was brought to me, who, five days previously, had had both eyes sprayed with lime, cement, and débris from a hose, into one end of which he had looked, and which he was about to use in washing his automobile. Unknown to him, the hose had been used by men working with lime and gravel.

The right eye presented numerous adhesions between the eyelids and the eyeball. Fortunately, the cornea was clear, and daily separation of the involved structures has left an eye with vision better than 20/16.

The left eye was very different. Here were extensive adhesions, and a cornea so thoroughly cooked that it resembled porcelain. What was to be done in the attempt to save a sightless globe with normal movements? Evidently the logical procedure would be to separate the adhesions and prevent their re-formation by means of Thiersch grafts. Under general anæsthesia adhesions were severed, dissection was carried to and slightly beyond the extent of the normal fornices, and re-attachment was prevented by anchoring grafts between the eyelids and the eyeball. A huge graft was sewed into the upper fornix. The lower fornix presented a more difficult problem. Here a silver plate (provided with several openings at each end), of the approximate length and depth of the inner surface of the lower lid, was used. A large graft was spread over and was sewed to the plate. The plate, thus covered, was then placed with its lower edge about 2 mm. below the lower boundary of the fornix, and was anchored to the eyelid.

The end justified the means so far as concerns the separation of the lids from the globe. In a short time the globe became soft and distorted, and showed signs of impending perforation of the cornea. At the end of four weeks the eyeball was enucleated. The attempt to save the globe was a failure; but, on the other hand, the patient has an ample space for a prosthesis. He wears a too-large eye at night, to prevent contraction of the tissues; and a smaller, cosmetic, one by day.

St. Louis, Missouri.

PROGRESS OF SHROPSHIRE HOSPITAL.—Extensions now being carried out at the Eye, Ear and Throat Hospital for Shropshire and Wales include a new out-patient department and a new ward and dormitories for the nurses and staff. In response to a call for 1,000,000 shillings £40,000 have already been received, and of this the hospital's share is £7050. During 1925 4465 patients were treated, and still there is a waiting-list of 200.

Medical Societies.

MANCHESTER MEDICAL SOCIETY.

AT a meeting of this Society held on March 31st Prof. A. H. BURGESS, the President, took the chair, and Dr. T. A. GOODFELLOW opened a discussion on

Rickets.

The discovery of the accessory food factors by Gowland Hopkins in 1912 was, he said, the starting point of the intensive research of recent years. Various ætiological theories had been from time to time suggested. At present these were concerned chiefly with hygienic causes and dietetic causes; the importance of the former was stressed by the Glasgow School and this view claimed support from the work of Margaret Ferguson under the Medical Research Council. The more recent work—especially that of the Mellanby's, of the British research workers in Vienna, published in 1923, and of many observers who had been noting the effects of the ultra-violet rays upon animals and foodstuffs as well as on rickety children—has considerably narrowed the field for discussion. The majority of observers now agreed with Mellanby that the three essential factors in the ætiology of the disease were: (1) an organic factor in the diet which is concerned in the calcification of bone; (2) light, either direct sunlight or radiations from the mercury-vapour quartz lamp; (3) an adequate amount and correct balance in the diet of the salts of calcium and phosphorus.

Dr. CATHERINE CHISHOLM dealt with the manifestation of rickets in the first two years of child life. She drew attention to the frequency with which child after child in one family contracted rickets, the incidence being out of all proportion to that of a family of neighbours living under similar conditions. Attention should therefore be paid to familial tendency. Personal idiosyncrasy, as shown by one twin taking rickets when housed and fed like its brother, has also to be considered as a factor. The weaning time of 200 cases of rickets entering hospital at varying ages showed a predominately large number of cases weaned in the first two months. Investigations were made on 75 children in Manchester and it was found that of these infants a certain number were weaned before the age of two months. Seventy-five per cent. of these early-weaned cases developed rickets; though the incidence of rickets in the 75 children under observation was 26·6 per cent.

Whether rickets was primarily (*a*) a disease of bone, or (*b*) the defect was merely one symptom of an entity, rickets, or (*c*) the rickety condition was merely a symptom or sequela of wasting diseases, at all events, said Dr. Chisholm, the bone change was the main feature of the condition found. A combined radiological and clinical examination was therefore necessary in diagnosis. The classical clinical symptoms alone could not be depended on. Two types of rickets were well described by Wimberger. Clinically, it was easy to under-estimate the amount of bone change in mild cases of the first or florid type, and radiologically in the second or passive type. As to the general incidence of rickets in the population, Thomson, of Edinburgh, stated that between 1895–1900 over 50 per cent. of the children under 3 years of age attending the Hospital for Sick Children showed unmistakable signs. Dr. D. H. Paterson had found 1·2 per cent. of active rickets in London in April, 1925; 32 per cent. had had rickets. Dr. Helen Mackay, in a different investigation, had found at least 8 per cent., but nearly all of them were slight cases. In an examination of 75 cases of unselected Manchester children who had never attended infant welfare centres, 26 per cent. of active rickets was found, of which two-thirds were well-marked cases. At least 46 per cent. radiologically showed suspicion of having had rickets. Of Dr. Paterson's London cases 92 per cent. were taking oil regularly. Of the Manchester district cases only five children—i.e., 6 per cent.—were having oil.

The treatment of rickets was obviously to supply the chemical constituents needed, in the form, or with the medium, which helped in their absorption, and under conditions which used them to the best advantage. Various attempts had been made to irradiate food lacking in vitamins or to isolate the vitamin factor and add to the diet. At the Babies' Hospital infants had been radiologically examined and watched on different lines of treatment. Unfortunately, it was impossible to deal with infants as laboratory animals, and intercurrent troubles were always arising to confuse the experiments. But the apparent results at present were:—

1. With a well-balanced diet alone, rickets may be healed even when advanced; but this takes a long time, during which the infant must be given exercise, but prevented from putting weight on his weak limbs. The healing is irregular as well as slow and shows relapses.

2. Massage in addition is not of much value in the actual healing of rickets where bone lesions are marked. The muscles may improve, the child may learn to walk, and progress may apparently be satisfactory, but the bones only heal slowly.

3. Cod-liver oil is the most dependable single agent for cure and in combination with Parrish's food is a reliable mode of regularly healing rickets.

4. Mercury-vapour light certainly helps to cure, particularly in the lethargic type with flabby musculature or the small atrophic type. Both types of infant seem to be stimulated by the rays and respond well.

The use of cod-liver oil with ultra-violet rays, said Dr. Chisholm, was an excellent and quick combination. A combination of food, massage, light, and oil certainly produced the quickest and best results in the cases selected in the autumn of 1925. Best of all, however, was cod-liver oil and natural sunlight, even in Manchester, when the summer was good, and when the infants were properly fed and clothed, and exposed under suitable conditions.

Mr. HARRY PLATT said that to the surgical mind rickets essentially presented a problem in the prevention and cure of deformity. Many of the efficient measures used to-day in the treatment of rickety deformities had undergone little modification since their introduction many years ago. At the present time operative intervention in rickets was being placed on a sounder basis. A deformity corrected in the stage of florid rickets was always likely to recur, so that some criterion of the activity of the disease was needed. This had now been provided as a result of a study of radiograms of the epiphyses in the various stages. In the infant the radiological index of activity had been completely established, but it was not so definite in the older child or adolescent. A more careful clinical examination of patients presenting the syndrome of late rickets had revealed the occasional occurrence of so-called renal rickets, in which the operative correction of deformities was always followed by disaster. Such experience emphasised the importance of a careful examination of the urine, and an estimation of the kidney function.

Rachitic deformities which called for the attention of the surgeon usually affected the lower limbs, and of these there were three main types—bow-legs, knock-knee, and coxa vara.

Bow-legs was essentially a deformity which showed a tendency to spontaneous rectification and it was rarely necessary to employ any special measures, and still less necessary to operate. For the extreme degrees of deformity in older children, tibial, or more rarely, femoral osteotomy was occasionally needed. Manual osteoclasis was possible when the bones were

soft, but at this stage spontaneous cure could be expected in the majority of cases. Anterior bowing of the tibia was a deformity often best left alone. Its correction by operation in the extreme cases was not easy.

Knock-knee, in contra-distinction to bow-legs, was usually a progressive deformity and, once initiated, tended to increase long after rickets had healed. As it was determined chiefly by weight bearing, in the early stage this should be prohibited wherever possible. Under the exceptional conditions of an open-air hospital, moderate degrees of rachitic knock-knee would disappear without any form of splinting. In ordinary hospital out-patient practice it was usual to apply a corrective walking appliance, the best form being the classical knock-knee brace of Thomas. A great many cases of knock-knee in older children, however, came for operative correction, and on the whole the results of femoral osteotomy were exceedingly good, provided the after-treatment was adequate. In younger patients, after femoral osteotomy, the limb could be treated by immediate fixation in a plaster-of-Paris spica. In the adolescent and young adult it was desirable, however, to employ traction on a Thomas splint for as long a period as possible. This minimised the angulation and overlapping of the fragments and helped to ensure rapid union. Re-fracture after a femoral osteotomy was not an uncommon experience. In the older patients it was sometimes difficult to reproduce the full mobility of the knee-joint in a short time.

Rachitic coxa vara could be almost ignored, as it was chiefly a deformity appreciable only in radiograms. It had long been recognised that it invariably underwent spontaneous cure. Deformities of the upper limb possessed little surgical interest. Deformities of the chest were important, and once fully developed could rarely be corrected, although general benefit was gained from regular gymnastic exercises. In the production of spinal deformities rickets was a subsidiary or negligible factor.

Dr. G. V. ASHCROFT read a paper on

Renal Rickets,

in which he presented the results of an inquiry made at Ancoats Hospital into the association of rickets with renal disease. One typical case was described in detail with results of urea tests. In renal rickets, he said, the clinical picture was one of the onset at puberty of deformities of the late rickets type, associated with a profound muscular asthenia, pallor, stunting without infantilism, urine of low specific gravity, pale in colour and containing albumin, a notable absence of œdema and cardiovascular change, a negative Wassermann, a negative Lœwi, and a negative Goetsch test. The X ray picture was one of rarefaction and metaphysical abnormality, hazy porosis, enlargement and lack of cortex, associated with some rachitic changes at the epiphysial line. Post-mortem examination showed chronic interstitial nephritis associated with fibrosis of the suprarenal gland and an inactive thyroid gland. The degree of renal involvement was roughly parallel to the degree of clinical and X ray abnormality. It was to the association of the typical clinical picture, the typical X ray picture, and deficient renal function that the term renal rickets had been applied. Dr. Ashcroft laid emphasis on the risk of uræmia following operation and the poor result obtained by osteotomy in such cases. In view of the frequency of the condition and the ease with which it might be overlooked, it was suggested that before an adolescent with bone deformity came to operation renal function tests should be carried out. Of the 24 adolescents with rickets investigated, 33 per cent. revealed definite renal inefficiency and 54 per cent. revealed some renal defect. Sufficient evidence had been found to warrant the suggestion that while the kidney lesion was responsible for certain of the findings, such as albuminuria and death from uræmia, the greater part of the condition might be due to fibrosis of the suprarenal gland.

LIVERPOOL MEDICAL INSTITUTION.

AT a pathological meeting held on March 25th Dr. J. C. M. GIVEN, the President, took the chair, and Mr. D. R. OWEN read a paper on

Acute Phlegmonous Gastritis

in which he described two cases recently seen at the David Lewis Northern Hospital within a few weeks of each other.

1. A female, aged 60, who gave a long history of indigestion, was admitted and operated upon for perforated ulcer. The true condition was diagnosed at operation, and an anterior gastro-enterostomy was performed with a view to draining the stomach; abdominal drainage was also provided. She died, and the diagnosis was confirmed at the autopsy 24 hours after operation.

2. A man, sent in with the diagnosis of perforated ulcer, was operated on as an "acute abdomen," the signs not being typical of perforation. The condition was recognised at operation, and as there was pus in the pelvis all that was done was to place a drainage-tube in the recto-vesical pouch. The abdomen was then closed.

At autopsy a similar condition was found in each case. The stomach was greatly thickened and showed signs of acute inflammation; its cut walls oozed pus. There was an acute cellulitis of the stomach in each case, although there was no sign of recent ulceration, and no cause of the cellulitis was found. In the first case bacteriological examination was not made, but in the second a mixed infection of *B. coli* and streptococci was found.

One point which Mr. Owen wished to bring out, he said, was the presence in these cases of a stomach dullness area, not previously described, such as might be expected considering the pathological findings.

After describing the recognised localised and diffuse types of the disease and showing that his cases belonged to the latter—the so-called idiopathic or primary phlegmon of the stomach—he suggested that some of Alexis Thomson's cases of fibromatosis of the stomach might have been cases of cured phlegmon of the stomach. The ideal treatment, he said, was gastrectomy, but at the time when they were seen these patients would not stand such an operation. He therefore advocated the application of general surgical principles, when the condition was recognised after mid-line or right abdominal section, which would be the usual operation performed. The two essentials were to feed the patient and to deal with a cellulitis. He was therefore in favour of a jejunostomy through a new incision to the left—in order to feed the patient and to relieve any distension which might occur—then opening the stomach and incising its thick walls to let out the pus. Before opening the stomach it should be fixed to the abdominal wall to prevent infection of the peritoneal cavity. In this situation it could be treated as any other cellulitis would be treated. If serious hæmorrhage were feared the main vessels of the stomach could be secured before making incisions into its walls. In favour of this he argued that further operation would almost certainly be necessary if the patient recovered for removal of adhesions or of a fibrotic stomach, and therefore the cutting off of the gastric blood-supply would not be of great danger. As in the past, only one or two cases had been known to recover; he thought that new, even if heroic, measures were needed.

NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY.

AT a meeting of this Society held on March 31st Mr. H. BELL TAWSE, the President, took the chair, and Mr. VICTOR BONNEY read a paper on the

Causes of Sterility and their Treatment.

Speaking of sterility generally, he said, there were certain factors which could not be accurately assessed and certain others which could. Prof. Arthur Robinson had shown that in animals—and probably also in human beings—there was a wastage of 40 or 50 per cent. of the ova shed by the ovary in circumstances favourable for fertilisation. This wastage

was brought about in several ways. Some ova never reached the tubes, but were lost in the peritoneal cavity; others, though they reached the tubes, did not blend with a sperm, though sperms were there; others again, though blending with the sperm, perished within a few days of the union, apparently owing to an inherent deficiency of vitality. There were at present no means of diagnosing such happenings in the case of a sterile woman, nor indeed of being sure whether she ever passed fertilisable egg-cells out of her ovary. The factors which could be assessed were the patency of the genital canal from top to bottom, the healthiness of the sperm, its deposition in the vagina, and its ascent therefrom. Patency of the female genital canal was essential, and the recent introduction of tubal inflation had greatly extended our diagnostic capabilities in this respect. Every woman examined under an anæsthetic to find the cause of her sterility should have her tubes inflated, and if they were found blocked the best course in most cases was to open the abdomen at once and attempt to overcome the obstruction. The attempt was often successful, the most favourable cases being those in which the abdominal ostia alone were closed as the result of pre-existent inflammation. Absolute blockage in the uterine and vaginal segments of the canal was rare, but stenoses were not uncommon in the cervix and at the vaginal orifice; good results often followed operative dilatation of the cervix.

The upper two segments of the genital canal, said Mr. Bonney, were the follicle itself and the space between it and the abdominal ostium, this latter being the peritoneal segment of the canal. Obstructions could occur from non-dehiscence of the follicle or from the intervention of omental or other adhesions in the peritoneal segment. Non-dehiscence of the follicle did not lend itself to treatment, but obstruction between the follicle and the abdominal ostium might be cleared away. Much could be done by conservative surgery on the uterus, the tubes, and the ovaries to preserve the existing chances of pregnancy or to make pregnancy possible when hitherto it had been impossible. Emphasising the propriety of examining the man as well as the woman, Mr. Bonney spoke of the phenomenon of profluvium seminis and of the possibility of the sperms being killed by the vaginal discharge. Nothing much of scientific value was known about this last; the subject needed investigation, but it was difficult to get anyone to undertake it. As regards artificial insemination, his own experience had been uniformly disappointing, but where, on account of physical deformity, the sperm could not be deposited in the upper vagina it was the logical treatment.

The address was discussed by the PRESIDENT, Dr. J. C. BUCKLEY, Dr. G. E. J. A. ROBINSON, Dr. J. WATSON, Dr. W. R. SMITH, Dr. C. D. LOCHRANE, and Dr. C. H. ALLEN.

Reviews and Notices of Books.

STATISTICAL METHODS.

Statistical Methods for Research Workers. By R. A. FISHER, M.A., Fellow of Gonville and Caius College, Cambridge; Chief Statistician, Rothamsted Experiment Station. Biological Monographs and Manuals. No. III. General Editors: F. A. E. CREW, Edinburgh; D. WARD CUTLER, Rothamsted. Edinburgh: Oliver and Boyd. 1925. Pp. 239. 15*s*.

THE ideal position for a research worker to aim at is to be as independent as possible of statistical methods—to be able, that is, so to arrange his experiments as to allow one condition, and one only, to vary at a time, and thus to get a direct answer to a direct question, unclouded by the variation of disturbing factors irrelevant to the point at issue. In no field of research are workers wholly in this happy case—least of all in medical science. This is obvious enough in its final application, dealing as it does with man himself with whom experiment is clearly restricted. Here to a large extent the observational method must be used, disturbing conditions are partly out of control, it is not always possible to repeat an experience, and at times the whole staging of the experiment is, perforce, in the hands of Nature. Between pure observation and the ideal experiment lies a very wide field of research work which is more or less closely dependent on accurate statistical treatment as it approaches one limit or the other. Prof. Topley's recent Milroy lectures, lately reproduced in these pages, illustrate one branch of medical research—that of epidemiology—in which even in its experimental form the methods of the statistician are indispensable.

The research worker who is led by the title of Mr. Fisher's monograph to expect a comprehensive survey of statistical methods will be demanding more from the book than it offers. The clue to its content is found in the editors' preface, which states that one of the objects of this series is to give those who have contributed notably to the development of a particular field of inquiry the opportunity of presenting the results of their researches in a more extended form. This work deals chiefly with the large number of statistical problems which confront the laboratory worker who is obliged to deal with comparatively small samples. It is described by the author as an elementary book, is without mathematical proofs, and is designed for readers without special mathematical training; thus it is out of the ordinary run of statistical text-books—above them in many respects, in others below them. It is above them in so far as Mr. Fisher is an expert and original mathematical statistician, and the book is based largely on his own work in adapting suitable methods to the practical problems in view. The methods explained are illustrated by numerical examples, well chosen as typical of those which continually arise in practice. The numerical tables given are put in a simple form for practical use, so that tests can be made without the evaluation of complicated algebraic expressions. The faults of the book are such as arise from Mr. Fisher's talents. He has not always wholly succeeded in putting himself in the place of his less accomplished reader and realising his difficulties, though on the whole this work shows in that respect a great advance from the somewhat obscure style in which Mr. Fisher's purely mathematical works are written. No indication is given to the beginner as to which of the methods described are generally accepted, and which are based on convictions which are still a matter of controversy between Mr. Fisher and other statisticians of equal eminence. A certain lack of historical sense is shown by the rather inadequate acknowledgment of the work done by earlier writers. Perhaps Mr. Fisher owes more than he realises to the "traditional machinery of statistical processes" of which he speaks so scornfully, and not least to the extension of that machinery by Prof. Karl Pearson. One or two minor defects may be noted. The first example, which is designed to illustrate a method of calculation, is obscured by the introduction of technical terms which will be unfamiliar to many readers. It is definitely outside the scope of the work to give proofs of the methods described, but references in the text to the bibliography would help many who are not content to take everything on trust, and wish to know where the proofs may be found.

The ground covered is well suited to the needs of the practical worker. The introduction contrasts the aims of modern statisticians and those of their predecessors. The older workers were chiefly concerned with average or aggregate values, while "from the modern point of view the study of the causes of variation of any variable phenomenon, from the yield of wheat to the intellect of man, should be begun by

the examination and measurement of the variation which presents itself." This leads at once to the idea of a frequency distribution, and to that of a hypothetical population of which the data observed may be considered as a sample. The behaviour of the different "constants" or typical values chosen to describe a population, when random samples are taken, is the basis of the tests of significance by which we can examine whether or not the data are in harmony with any suggested hypothesis. If, for instance, we wish to compare the rates of growth of two parallel cultures of an alga, we shall not be able to decide if the difference is definite enough to assert that culture B was growing more rapidly than culture A, unless we know what sort of chance variations in the rates are to be expected in samples of that size in which no real difference exists. The three most important distributions—the normal, the binomial, and the Poisson—are clearly described and illustrated, and also the manifold uses of Pearson's "Goodness of Fit" test of the agreement between observation and hypothesis.

"Student" gave in 1908[1] tables which made it possible to test whether the observed mean of a small sample differed from any theoretical mean to a greater degree than was likely to arise by pure chance. Mr. Fisher gives these tables in a simplified form, and also shows how to use them for the even more frequently recurring problem whether the difference between two observed means of small samples is large enough to justify the assumption of a real difference between the samples. From the significance of means we are led on to the idea of "regression"—i.e., to the expression of the average value of any variable in terms of the values of one or more other variables—e.g., the average yield of a cereal for given values of rainfall and temperature during the preceding year. The treatment of the correlation coefficient—a measure of the degree in which two quantities increase or decrease together—is clear, but Mr. Fisher seems to do less than justice to the more complete measure of association, the correlation ratio. Tables are given to test the significance of differences in correlations found from small samples, and to combine a number of independent estimates into an improved estimate by means of a transformation, suggested by the author, which leads to a simpler distribution of sampling errors than that of the correlation coefficient itself. The final chapters on intra-class correlation and the analysis of "variance" will not be found easy by the beginner, but will repay careful study on the part of the student with experience, and will help him to grasp the analogy between evaluating the correlation between members of the same class (say correlation in yield of potatoes grown on the same patch), and the estimation of the relative importance of different groups of factors causing variation. The book contains much that is of value, and will be useful both for reference in practical work and as a summary of the treatment of small sample problems. The average beginner in statistical methods will, however, find himself at times in rough seas if he tackles it alone as his first introduction to statistics.

TUBERCULOSIS.

Die Lungentuberkulose. Third edition. By Dr. FELIX KLEMPERER. Berlin and Vienna: Urban and Schwarzenberg. 1925. Pp. 239. M.10.80.

Dr. Klemperer's text-book has evidently found a place in German medical literature, for this is the third edition to appear since 1920. The book is well-balanced and gives a proportioned survey of the subject, from the historical introduction to an appendix on climate in tuberculosis. In the chapter on pathological anatomy the writer uses the nomenclature of exudative and productive tuberculosis, introduced by Aschoff, which in continental writings of recent years seems to have replaced the older nomenclatures of tuberculosis. Gräff and Küpperle's classification of primary, bronchogenic, and hæmatogenous is also given. The use in addition of the terms "primary," "secondary," and "tertiary tuberculosis," on the analogy of syphilis, appears to us to confuse rather than to help. In the brief section on statistics, figures are given showing the influence of the social factor in tuberculosis; here the death-rate is arranged for families with different incomes, whilst a subsequent table shows the influence of the housing problem by tabulating the death-rate according to the number of rooms per family. The table giving comparative mortality-rates for the different European countries is meagre and incomplete. In the chapters on diagnosis, modern serum diagnosis and X ray examination receive due consideration, and in chemotherapy the heavy metals and other modern drugs are discussed, as well as the recent work on sanocrysin. Treatment with tuberculin is dealt with at considerable length, Friedmann and Ponndorf's methods receiving an unusually large amount of attention. The Deycke-Much antigens are also described in detail. These various active immunisation methods evidently continue to play a larger part in the treatment of tuberculosis in Germany than they do in this country. Artificial pneumothorax technique and surgery of the chest are also discussed, but these important sections appear to us to be summarised rather too briefly in comparison with the greater detail given to specific inoculation treatment. A bibliography chiefly confined to German works is excellent as far as it goes. The book contains numerous illustrations of value, and is a sound work eminently suitable for the general practitioner and the post-graduate student.

[1] Biometrika, vi., 1–25.

ESSENTIALS OF PSYCHIATRY.

By GEORGE HENRY, M.D., Senior Physician, Bloomingdale Hospital. Baltimore: Williams and Wilkins Company; London: Baillière, Tindall and Cox. 1925. Pp. 199. 13*s.* 9*d.*

UNTIL the pathological bases of mental disorder are properly established, it is fairly sure that there will not be a really good book in psychiatry. At present psychiatry is too elusive and too wide a subject to lend itself to text-book treatment, and the only chance for an author to achieve some measure of success is to decide beforehand exactly what aspect he is going to stress and to which public he is going to appeal, and then to keep this object relentlessly before his eyes. For instance, he may deal with insanity as it appears to the clinician, the biochemist, the psychologist, the nurse, the social worker, or the advocate of religion, and, if he endures to the end, he has a good chance of teaching his limited public quite a lot that they did not know before. He may, if he wishes, include all that the pathologists have discovered up to date about insanity; it will not appreciably distend his book, and so far from confusing the issue will clear up several points which would otherwise remain obscure. But if he once falters and hopes to compromise between more than two at most of these points of view he is lost.

This is the rock upon which Dr. Henry has floundered. It is obvious that he has been powerfully attracted by the claims of the social worker to psychiatric knowledge, and very rightly. There is a crying need among voluntary helpers for a sound, intelligible, popular work on mental disease. But, having this desire, he should have followed it instead of attempting to give his book a veneer of clinical respectability at the same time. The result has been a splitting-up of his personality into five or six portions, of which not one possesses enough of the original interest-flow to make it worth while in itself. He has dealt with the clinical aspect, but so superficially and flittingly that the clinician will turn away empty. He has pronounced leanings towards Freudian psychology, but he never develops fully its implications in the subjective life of any one case. He has a chapter on insanity and law, where he indicates a few details on certification and responsibility, and adds a good chapter on nursing, written by Miss Adèle Poston. There is hardly a word on pathology or morbid anatomy,

and not a single reference to another book. He only obtains relief from the abstract and passive kind of attitude which obscures the clinical part of his book when he is writing frankly for laymen about evolution, psychiatry for the social worker, mental hygiene, and the number of great men who have had something wrong with their minds. This section is of its kind excellent, and the author would be well advised to go further and produce a book for the social worker written, like this one, "in language which is within the range of familiarity to the general public," but free from a dead weight of unhappily-presented clinical material. The present work cannot be of use to the professional psychiatrist, and is too cumbersome for the amateur. It is, nevertheless, an attempt at a difficult task, and Dr. Henry deserves credit for it. He is obviously enthusiastic enough about his subject to try to do better next time.

VETERINARY POSOLOGY.

Table of Veterinary Posology. And Other Information for the Use of Students and Practitioners. Fifth edition. By G. A. BANHAM, F.R.C.V.S., and WM. J. YOUNG, F.R.C.V.S., D.V.S.M. London: Baillière, Tindall and Cox. 1926. Pp. 359. 8*s.* 6*d.*

IN the preparation of the fifth edition of this book the authors have had material help from Mr. A. W. Noel Pillers, Mr. H. Gray, Mr. J. S. Lloyd, Sir John McFadyean, and Prof. F. T. G. Hobday. The manual has been increased in size by 100 pages, and in these useful information is given on the identification of parasites, and the Animals (Anæsthetics) and Horse-Breeding Acts. The Dictionary of Synonyms and Trade Names for Drugs is a long and comprehensive one, but it is by no means exact and needs some revision. For example, *oleum kervinum* and *oleum menthæ* are not trade names for castor oil and oil of spearmint respectively. The posological section of the work is well up to date, but we notice omissions of all the salts of silver in the *collyria*. As an animal product of wide application insulin might deserve mention.

The book is well known to all veterinary students and practitioners, and each successive edition has been an improvement and advance on its predecessor. We hope that no further increase in size will be made, since the work is designed for handy and quick reference.

CHRONIC PANCREATITIS WITH JAUNDICE.

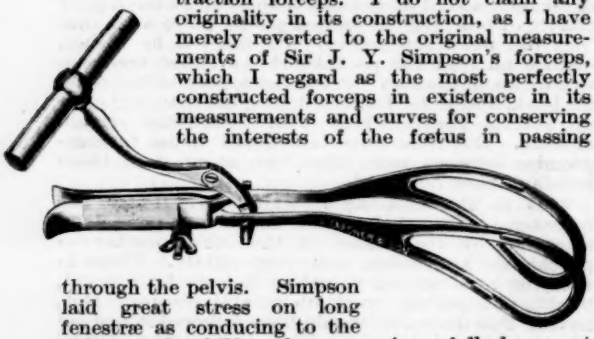
Pancréatites Chroniques avec Ictère. Causes, Diagnostic et Traitement. Valeur et Résultats Éloignés de la Cholécystogastrostomie. By Dr. PIERRE MALLET-GUY, Interne lauréat des Hôpitaux de Lyon, Aide d'Anatomie. Paris: Masson et Cie. 1925. Pp. 307. Fr.25.

Dr. Mallet-Guy has collected a series of interesting observations concerning those rare cases of jaundice due to chronic inflammatory lesions of the pancreas, with special attention to the results of cholecystotomy and cholecystenterostomy for the relief of this condition. The diagnosis between such lesions and those due to slow-growing cancers of the head of the pancreas or of the papilla of Vater is practically impossible and can, as the author rightly points out, only be determined by the clinical evidence of recovery and survival after the operation. Even in malignant cases there is usually considerable immediate improvement, and it is only the existence of good health 18 months or more after the operation that justifies a diagnosis of chronic pancreatitis as the original lesion. Altogether a useful little book.

New Inventions.

AXIS-TRACTION FORCEPS.

THE midwifery forceps here illustrated is a modified axis-traction instrument which I devised 16 years ago and have used ever since with satisfaction. By its use I have reduced my fœtal mortality in difficult cases by about 10 per cent., as compared with my previous results in similar cases with the ordinary rod axis-traction forceps. I do not claim any originality in its construction, as I have merely reverted to the original measurements of Sir J. Y. Simpson's forceps, which I regard as the most perfectly constructed forceps in existence in its measurements and curves for conserving the interests of the fœtus in passing



through the pelvis. Simpson laid great stress on long fenestræ as conducing to the safety of the child, and my experience fully bears out his contention. In the attempt to obtain axis-traction with traction rods the fenestræ have been shortened by half-an-inch in order to secure the attachment of the rods as high as possible, and even then real axis-traction at the upper strait is not secured, as I have demonstrated in my paper on the subject read to the Edinburgh Obstetrical Society in February of this year. In this forceps I aim at getting axis-traction without shortening the fenestræ. Traction with the traction handle secures sufficient axis-traction in the cavity and at the outlet in the ordinary average forceps case, and in the rare cases where axis-traction at the brim may be deemed necessary this can be secured by tape traction through the eyelet holes in the blades at the middle of the fenestræ. This tape traction (as advocated by Fabre) secures more adequate axis-traction at the brim than is possible with rods.

The measurements of this forceps from the Smellie lock upwards conform exactly to Sir J. Y. Simpson's measurements. I have shortened the handles for three reasons: (1) to indicate that they are not meant for traction; (2) to discourage the use of the handles for application (believing as I do that the blades should be applied by the shanks as tending to ensure their more gentle introduction by delicate manipulation); and (3) to allow the traction handle to work free from obstruction by the forceps handle without making the attachment of an inordinate length. The screw is the same as in the ordinary rod axis-traction forceps. Its use can often be to a great extent dispensed with, as the simple device which attaches the traction handle serves for all practical purposes to make the screw unnecessary after the forceps has been adjusted and traction has begun.

The construction of this forceps is very simple; there is no complicated mechanism to go wrong. It is a light instrument, not clumsy in appearance, and it combines the outstanding advantages of Sir J. Y. Simpson's original forceps with the added advantages of axis-traction and the minimum amount of compression of the fœtal head. In this forceps, I submit, the advantages of both the old and the new are conserved without detracting from the special features of importance in the construction of either. As it stands it is adapted mainly for traction in the cavity and at the outlet, which practically nowadays are the only situations where forceps should be used; but, in addition, it has potential arrangements for almost perfect high axis-traction by tape attachment should an exceptional case demand it.

The forceps is made by Messrs. Gardner and Son, Edinburgh, who have prepared standardised moulds so as to secure uniformity of the curves and fenestræ.

JAMES HAIG FERGUSON, M.D., F.R.C.P.,
F.R.C.S. Edin.

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THE MEDICAL USES OF RADIUM.

A SUMMARY of reports for 1924 from nine research centres to which various quantities of radium had been lent by the Medical Research Council forms the substance of the latest Green-book [1] to be issued by the Council. The book is less readable and informative than most of its predecessors. Perhaps this is because the reports from the various centres presented to the Radiology Committee appointed jointly by the Council and the British Empire Cancer Campaign are too briefly summarised; for example, details of technique are mostly omitted, having been set out in the reports for 1923 and incorporated in No. 90 of the Special Report Series. Another explanation which suggests itself is that information was not supplied by the different institutions in accordance with a uniform scheme, and that the task of correlating the heterogeneous pieces of evidence obtained was abandoned as impossible. Clinical investigations into the treatment of malignant diseases by means of radium are dealt with in the first half of the book, the rest being concerned with non-malignant diseases; a note on the experimental investigations on the physical and biological aspects of radium, which are being carried out in many laboratories, occupies barely two pages. In an appendix the arrangements made for the supply of radium emanation from the Middlesex Hospital are described.

Malignant conditions treated with radium are discussed partly according to site of tumour and partly according to the histological nature of the growth. Thus the first chapter deals with cancer of the breast, the second with cancer of the uterus (at least one case of sarcoma being included), and the third with carcinoma of the mouth, naso-pharynx, œsophagus, and larynx. The basis of classification is then changed, since the two following chapters are respectively on sarcoma and lymphosarcoma, and on rodent ulcer. Information as to cancer of the breast seems to have been sent only by the Middlesex and St. Bartholomew's Hospitals. The Radiology Committee concludes from examination of these reports that radium had a definite therapeutic value in breast cancer. Local recurrences are often held in check and may sometimes disappear. More information is required as to the optimum intervals of time and doses of radiation to employ in the surface therapy of inoperable breast tumours. As to uterine cancer, seven centres send reports, and the conclusions drawn are much more precise. The Committee regards the value of radium as a palliative in these cases as proven, its local effects being cessation of hæmorrhage and disappearance of local growth, and its general effects beneficial. Failures are mostly due to insufficient dosage in the periphery of the growth; a single tube of radium in the cervical canal is not found to be effective. Irradiation of tumours of the mouth, naso-pharynx, larynx, and œsophagus has been tried at five centres with mixed results; in some cases secondary growths have been made to disappear without the process of dissemination from undiscoverable primary tumours being stopped.

Certain points of interest emerging from the experience of individual centres should be pursued. Sepsis is cited more than once as a strong contra-indication to the use of radium. It is clear that a pyometra may result from its application to an infective cervix if fibrosis and stenosis follow, but even where no damming of discharges is to be feared infected areas appear to be unsuitable for radiotherapy, and this circumstance would seem to call for further study. It is but one of many points which remain unexplained. Our deep ignorance of the rationale of treatment by radium is revealed by the problems set out by the workers at St. Bartholomew's Hospital as still unsolved. Not only is it unsettled whether needles buried in the growth or screened tubes placed on its surface are more efficacious, but it is not even known what is the biological reaction to radiation of the individual cell, or whether the disappearance of the growth depends on the direct action of radium on the individual cell or on its effect on the surrounding structures or body fluids. Considering all these unknown factors, which include even such practical points as to whether a second application is of value or does actual harm, we are tempted to despair of any real progress until the histological effects of this dangerous and powerful weapon are more closely studied. Its haphazard empirical use may benefit individual sufferers but can lead to no useful general conclusions. It is obvious that insufficient advantage is being taken of the facilities for scientific investigation afforded by the Medical Research Council. For example, of a total of 66 cases of sarcoma and lymphosarcoma treated, only 11 specimens were sent up for examination, though all centres have been repeatedly asked to supply material from which the results of radium treatment might be correlated with the histological features of the tumour. The section on non-malignant diseases is concerned chiefly with gynæcological conditions and blood diseases. With regard to the former, the conclusion is drawn that radium is completely efficient in creating an artificial menopause, the usual dose for this purpose being 70 mg. in the body of the uterus for 24 hours. This conclusion would hardly appear to be substantiated by evidence from the London Hospital, where in four patients radium was employed to produce sterilisation. Complete amenorrhœa was not obtained in any of these patients (who did not, however, become pregnant) though they were treated with 100 mg. for 24 hours (two patients), for 26 hours (one patient), and 50 mg. for 24 hours with a second application of 100 mg. for 24 hours (one patient).

It may be unreasonable to expect conformity in dosage, screening, and conditions of application at the various research centres in a therapeutic measure still at the empirical stage, but it is difficult to see how progress can result from such uncorrelated reports as are assembled here. It would seem that a condition of the loan of radium in the future should be the adoption of certain standard techniques, so that the results obtained may be to some degree comparable. Possibly the development of the emanation centre, which supplies radio-active material in the form of radon, may provide more uniform statistics, but here the time factor adds an inevitable complication. Since individual suffering is being relieved it would be false to say that the distribution of radium is without benefit to the nation, nor need we think of the remedy in connexion too closely with malignant disease. A report on its use in tuberculous adenitis, written in our present issue by Dr. PHILIP

[1] Special Report Series 102. H.M. Stationery Office. Pp. 43. 1*s.* 6*d.*

GOSSE, from the Radium Institute, contains hopeful information concerning a widespread trouble. The medical uses of radium are undoubted, but the time has come when coördinated efforts are needed to evolve a standard technique.

THE SURGERY OF THE SPLEEN.

THE spleen is no doubt sometimes useful; it is evidently not necessary; medicine supplies us with illustrations of how it may be harmful. The very lack of comprehensive knowledge of the part which is played by this curious organ in the physiology of the body lends interest to any observations which may be made in human beings who suffer from splenic disease. Very possibly, as has happened in connexion with other bodily structures in the past, the secrets of splenic function will ultimately be deduced by arguing backwards from pathological disturbances. Certain it is that much of the surgery of the spleen has been arrived at quite empirically by clinical observation. The discussion on the surgery of the spleen at the Rome Congress, briefly summarised in another column, brought out very well the position to-day. Operative treatment may be called for when the spleen has been injured, when it has become abnormally loosely connected with its lodgment, when it has been invaded by certain organisms or by the echinococcus, when it is the seat of true tumour formation, and in certain diseases associated with splenic enlargement or changes in the blood. In injuries splenectomy is the procedure of choice, even when the rupture is not large; the organ does not allow of suture in general owing to its friability, and plugging a wound has been frequently followed by secondary hæmorrhage or sepsis. Yet it must be borne in mind that loss of the spleen seems to be a more serious event for the child during its period of growth than for the adult. To combat the ill-effects in children after splenectomy, small transfusions of blood and the administration of splenic or bone-marrow extract have been recommended. When the spleen is abnormally mobile, fixation has brought relief to a number of patients, yet sometimes removal is the better course, and it is a necessary one when torsion of the pedicle has taken place. Abscesses of the spleen are usually best treated by incision and drainage, by the posterior thoracic route when they are at the upper pole, through the abdomen when at the lower one. Only very exceptionally, when the abscess has remained wholly intrasplenic, is removal of the organ the proper procedure.

Most interest, however, circles around the question of splenectomy in those diseases of obscure pathology associated with splenic enlargement and usually with changes in the blood picture. The operation has been tried out sufficiently for us to be able to say definitely that it is absolutely called for in certain of these conditions and absolutely contra-indicated in others, whilst for some its value must remain doubtful until more results are collected. In splenic anæmia, which includes Banti's disease, it is generally accepted that the results are extremely good, particularly before hepatic cirrhosis has come on, but MAYO recommends that the operation should be performed even in the terminal stage as, after it, some patients have got well and lived for years. In hæmolytic jaundice operation is demanded only in the acquired disease and the recovery is usually symptomatically complete and permanent, though the fragility of the red corpuscles may remain. In Gaucher's disease it appears very doubtful whether splenectomy influences very much the course of the malady. In pernicious anæmia the operation has been well spoken of by certain surgeons, and the mortality has been very much reduced by careful selection of the time to intervene and the assistance of blood transfusions. Although transient improvement appears to have followed, it does not seem that the progressive course of the disease has been really affected to an appreciable degree. Splenectomy in purpura hæmorrhagica has produced striking, almost dramatic, results in rapidity of cure and its permanency. The former belief that this depends upon a restoration to normal of the blood platelet count would, however, seem to have been disproved by the experience of BRILL and ROSENTHAL in two cases under their care, for the platelets did not increase in number, yet the patients were cured. Leukæmia has for long been regarded as a disease in which surgery was contra-indicated, but MAYO, in 1924, reported that three patients had lived more than five years and eight for more than three after removal of the spleen; moreover, the danger of the operation has been considerably reduced by previous X ray exposures. Perhaps in the more chronic type of the disease surgery is justifiable and called for.

Many problems connected with the spleen remain unsolved. There is, for all practical purposes, only one surgical procedure possible in the treatment of its diseases—namely, its ablation. The scope of surgery is, therefore, obviously limited. Operative treatment will remain the method of choice in those conditions which arise in the spleen itself, whilst it can be no more than alleviative where the splenic condition is secondary. Only further study in the future will enable us to classify splenic diseases into these two categories correctly.

HELP IN CHOOSING A CAREER.

UNTIL very recent years, and even yet to a quite large degree, the choice of employment for a child leaving school has been determined by personal liking, parental suggestion, tradition (as typically in the mining and fishing industries), or opportunity. There has been, however, for some time a growing tendency on the part particularly of large industrial firms to make a selection by some method of testing of the most suitable types for their special work, and, on the other hand, on the part of educational and other authorities to discover for what work any particular child is best suited. Vocational selection and vocational guidance thus represent two distinct movements with one end in view. The construction of new intelligence tests, especially those of a non-linguistic type, has greatly contributed to these movements and has at the same time been fostered by them.

The most complete and systematic study of methods applicable to vocational guidance that has so far appeared has just been issued by the Medical Research Council.[1] The work was carried out by the Industrial Fatigue Research Board and the National Institute of Industrial Psychology, and consisted of an intensive study of 100 children (52 boys and 48 girls), who were due to leave school within a year. The main object of the study was to determine the best methods of testing for the purposes of vocational guidance, but in addition, actual advice was given to the parents on the basis of the results obtained, and a further inquiry was made two years later in order to discover the wisdom or otherwise of the advice given. The methods used were therefore largely experimental, and further research may lead to very considerable modifications. That the work was under

[1] A Study in Vocational Guidance. H.M. Stationery Office. 1926. 4s.

the general direction of Dr. CYRIL BURT, the psychologist to the London County Council, is a guarantee of its efficiency, and he had four able helpers in Miss FRANCES GAW, who had already standardised a group of performance tests, Miss LETTICE RAMSEY, Miss MAY SMITH, and Miss WINIFRED SPIELMAN, who report individually on their own sections of the work.

The schedule of investigation was comprehensive. An inquiry into home conditions, carried out at home, and including family and personal history, and a questionnaire regarding the child's out-of-school behaviour, hobbies, and interests, were the necessary preliminaries. Reference to school medical records was made, but no special medical examination was carried out. This is evidently felt by the director of the research to be a weakness which should be remedied in future investigations. Quite frequently, however, medical contra-indications had to be ignored, and there is certainly some truth in the contention that temporary physical conditions should not be given much weight in the choice of an occupation. The Stanford scale of intelligence tests was employed, supplemented by Miss GAW'S scale of performance tests and Pintner's non-language group test of intelligence. Dr. BURT'S scholastic tests served as a measure of school attainments, and, in addition, certain tests of special practical ability—mechanical, motor, or constructive—were utilised, and some interesting new tests of creative imagination. It was, however, in the estimation of character qualities that the greatest difficulty arose, and some striking comparisons were made in this connexion between the estimates made at one interview by observers to whom the children were strangers, and those made by teachers or others who knew the children well. Emotional qualities were found the easiest to assess by strangers, but with regard to definitely moral qualities, the provisional conclusion is that until more reliable moral tests are available, confidential reports by teachers and parents will have to be accepted.

An inquiry made into the circumstances obtaining after two years in the several occupations yielded interesting results, remarkably satisfactory considering the experimental character of the whole investigation. Of those who obtained work as advised all were satisfied (though not always with the salary), while of those who got work quite dissimilar to that advised, more than half were dissatisfied with the work or its prospects. The conclusion of the director is that the chief weakness of the scheme is imperfect knowledge, not of the children, but of occupations to suit their special aptitudes. The advice, he considers, was not always as good as the results of the tests, because of insufficient "job analysis." The booklet is of great interest, partly as an example of the wider application that is now being made of intelligence tests of different types, and partly from its own intrinsic significance. It is a matter of vast practical importance both to the country and to individuals that each person should find the occupation for which he is best fitted. One may, however, be permitted a doubt whether so comprehensive a scheme of examination is practicable on any large scale. And, although the workers in this investigation have not ignored it, it does seem necessary to insist on the importance of considering a child's own personal desires, where these are strongly marked. These desires do not always coincide with the child's abilities, and it must in some cases be a difficult matter to decide which is to be set aside. Have not the psychologists themselves warned us of the dangers of an uncongenial occupation?

AN HISTORIC ORTHOPÆDIC HOSPITAL.—The Duke of Devonshire has formally opened Bretby Hall as an orthopædic hospital for Derbyshire. The house, which succeeded that in which the author of the famous "Chesterfield Letters" lived, was built early in the nineteenth century and was ultimately inherited by the late Earl of Carnarvon, whose mother was the only daughter of the sixth Earl of Chesterfield.

Annotations.

"Ne quid nimis."

MERCHANT SEAMEN.

THE health of our merchant seamen, or strictly speaking their ill-health, possesses two champions in the persons of Dr. Howard Jones and Fleet Surgeon W. E. Home. Both have drawn attention to the absence of hygienic conditions in the merchant service, to the high mortality—so far as it can be estimated—existing among the men, and to the difficulty of obtaining accurate information as to the exact position. Fleet Surgeon Home has described[1] conditions aboard ship from his own experience, and the picture he has drawn is far from pleasing; yet no effort has been made to contradict it. During the past fortnight he has returned to the charge in our columns in an effort to estimate the serious toll of lives taken annually. The difficulties he has had to face in making his estimates are great; for uncertainty surrounds on the one side the size of the population at risk—i.e., the number of merchant seamen, and on the other the deaths to be ascribed to this population. The Board of Trade issues some information as to deaths among seamen while signed on as crews, but even here the cause of death is often only as correct as a ship's captain can make it. The Board has no information as to deaths among seamen ashore and no longer in active service; that is to say, it has no information as to deaths from those very diseases for which an unhealthy occupation directly prepares the way. The Registrar-General, on the other hand, obtains information as to deaths of seamen ashore, but none as to deaths abroad while on service, and his population at risk is merely that of seamen at home at the moment when the decennial census is taken. It is put forward by Fleet Surgeon Home that between two stools—in this case two Government departments—the case of the merchant seamen is allowed to fall unexplored; the plea seems sound. He asks that the whole matter should be transferred to the Ministry of Health for thorough investigation so that the facts, so far as they can be ascertained, shall be known.

The available evidence displays the merchant service as no health-giving occupation, even after every latitude has been granted for errors in data. But accident risk, with the disappearance of the sailing ship, has greatly diminished, and this is something to the good. Sails, however, made way for the stoke-hole and the lot of the merchant seaman there has been far from enviable. The substitution of oil fuel for coal is now coming to act beneficially, as has been shown by Vigné and Cury.[2] These investigators contrasted the time lost for sickness on Atlantic liners before and after the introduction of oil, and found great advantage on the side of the new fuel. These changes, however, cannot entirely make up for overcrowded and unventilated sleeping bunks, absence of feeding accommodation, and lack of washing facilities. The treatment of the human factor in our merchant service, when its history comes to be written, will rank alongside that meted out to children in our factories a century ago—space for cargoes is still too valuable to sacrifice for human life.

HOSPITALS AND RECOVERY HOMES.

FOR some years past hospital specialists have been acutely divided as to the effect of recovery homes upon the work and finance of the parent hospitals. On the one side it is argued that these homes decrease waiting-lists, reduce the cost of working, and increase the economic use of the hospital staff and apparatus. That was the line taken by Dr.

[1] W. E. Home: Merchant Seamen. John Murray. 1922.
[2] Vigné, C., and Cury, H.: Les Conditions d'hygiène dans les Chaufferies au mazout à bord des navires marchands. Bull. Off. Internat. d'Hyg. Pub., 1925, xvii., 979–89.

F. N. Kay Menzies and Mr. R. H. P. Orde in a paper read at the annual congress of the Hospital Officers' Association last year, which we printed in substantial length at the time (THE LANCET, 1925, i., 1115). Their paper was intended as a refutation of the conclusions of a subcommittee of King Edward's Fund, arrived at, after long and careful inquiry, in 1923. Now Mr. R. H. Maynard, the secretary of that Fund, has addressed a rejoinder to an ordinary meeting of the Association, in which, in arguments based upon the diagrammatic method, he essays to prove that the average cost of treatment in a hospital and in a home of recovery—an intermediate place between the hospital and the convalescent home—is approximately the same. His figures are necessarily complicated and, since it is the sacred duty of any given expert to pick holes in the conclusions of any other expert, we have no doubt that Dr. Menzies and Mr. Orde still have shots in their locker. Meanwhile, it seems probable that, since the circumstances of one hospital differ from those of another, both sides may sometimes be right. In any case, even if recovery homes are, as a fact, in some instances cheaper than hospitals, there is clearly a strong case for their extension. Notwithstanding the high importance of reducing hospital expenditure, finance is perhaps not the best aspect from which to consider the question. The object of hospital treatment is to cure the patient as quickly as may be consonant with thoroughness, and there are obvious, and almost overwhelming, advantages to himself in sending him to the pure air and the reposeful atmosphere of a recovery home as soon as possible. So long as he is in a hospital ward he knows that he is a "case" and his mind is never free from some degree of anxiety and apprehension; once he is in a recovery home he knows that he is getting well. The problem is, therefore, fundamentally psychological and its financial aspect, although full of moment, is of secondary significance. Thus so long as recovery homes do not send up costs they are plainly highly desirable, and the more we have of them the better for the patients. Fine air and quiet rural surroundings are always important elements in convalescence from illness serious enough to have needed hospital, and probably surgical, treatment. Moreover, the hospitals cannot afford to lose sight of the secondary advantage of the quicker emptying of beds.

A REMARKABLE CASE OF CANCER.

A CASE of cancer of quite exceptional interest is reported by MM. P. Lecène and A. Lacassagne.[1] In February, 1923, a woman had been operated on for advanced cancer of the breast from which a few months after the operation she died with extensive metastases. A fortnight after the operation a student of medicine, aged 21, was told to remove by puncture the fluid which had collected under the scar. In doing so, as the result of a sudden movement on the part of the patient, the syringe broke in the student's hand and the needle which was attached to it was driven deep into the palm of the student's left hand. A small amount of fluid was already in the syringe and some of it was thus injected into the deep tissues of the hand. The student cauterised the wound himself about three-quarters of an hour after the occurrence. During the following two years he noticed nothing. But in February, 1925—that is to say, two years afterwards—he noticed some swelling with diffuse pains. A month later on examination swollen lymph glands could be felt in the left axilla, which were diagnosed as tuberculous in view of the previous history of tuberculous glands in the neck during childhood. The glands were removed for diagnostic purposes. Soon afterwards the swelling in the left hand became more circumscribed and threatened to break through the skin so that an operation became necessary. On microscopic examination it was found that the tissue removed from the hand was a malignant new growth of the nature of a spindle-celled sarcoma and that the lymph glands contained metastatic deposits. A few months later, in September, 1925, four separate nodules appeared in the arm and forearm. They were adherent to the skin. One of these nodules was removed and proved to have the same structure of a spindle-celled sarcoma. The whole arm was then removed by disarticulation at the shoulder-joint, and at the time of publication the patient was quite well.

The paper is accompanied by very clear drawings which show quite clearly that the tumour in the woman has a very different histological structure from that in the man. The former is described as an atypical mammary carcinoma. The several new growths in the man present in all the sites the picture of a typical spindle-celled sarcoma. Pieces of the sarcoma were transplanted into animals of different species (monkey, dog, chicken, mice, rats). The results were all negative. If it is assumed that the neoplasm in the man resulted from the transplantation of living cells, the further assumption becomes necessary that in the course of this transplantation a sarcoma arose from the carcinoma; or, alternatively that, in spite of its histological appearance, the neoplasm in the man was not a sarcoma but an atypical epithelioma, and that the mammary cells had undergone this change as the result of their introduction into a new host. Neither of these two explanations is very convincing. In the many hundreds of animal tumours which have been studied in series of transplantations such changes have never occurred at the first transplantation. The transformation of an epithelioma into a sarcoma has been observed as a very rare occurrence in a few strains of tumours. But even then it was a gradual process, beginning as a mixed tumour in which, on subsequent transplantation, the sarcoma cell, gradually overwhelming by its more rapid proliferation the carcinoma, and not, as in this case, a complete transformation at the first transformation. The third possibility is that we are dealing here not with the reproduction but with the new formation of a tumour. Such an explanation would presuppose some process of microbic infection similar to that postulated by Gye. Whatever the explanation may be the case is of unique interest.

[1] Annales d'Anatomie Pathologique, 1926, iii., 97.

GUILTY BUT INSANE.

IF the report of Lord Justice Atkin's Committee on Insanity and Crime by no means satisfied the views of the medical profession, it did at least propose one obvious reform of the law—namely, the abolition of the illogical and confusing verdict of "guilty but insane." The Committee's report, upon which we commented when it appeared in 1923, points out unanswerably that the word "guilty" in criminal trials should connote only criminality, the commission of a crime—the very thing which a finding of insanity negatives. Such a finding is a verdict of acquittal, for an accused cannot be "guilty" of a physical act which is not in itself an offence. In the face of the Committee's recommendation it seems hardly credible that the Army and Air Force (Annual) Bill proposes to perpetuate the present illogicality by making it possible for military and Air Force courts martial to give a verdict of "guilty but insane." The official notes on the clauses of the Bill speak airily of bringing military law into line with the Trial of Lunatics Act of 1883. This is as progressive a proposal as if one were to suggest bringing modern ordnance up to the standard of primitive man's bow and arrow.

The story of this legal muddle has been told before, but evidently still requires repetition. The Criminal Lunatics Act of 1800 allowed a jury, when acquitting an accused person after hearing evidence of his insanity, to return a special verdict that he was "insane at the time of the commission of such offence" and that he was being acquitted on account of his insanity; thereupon the accused was kept in custody during His Majesty's pleasure. This

worked well enough until, some 80 years later, a madman named Maclean fired a pistol at Queen Victoria. He was found not guilty on the ground of his insanity, and in the heat and sensation of the moment the law was unfortunately altered. Her Majesty, as the recent publication of her correspondence has shown afresh, possessed strong and usually shrewd opinions which she was not afraid to express. Her feelings at her attempted assassination and at the result of Maclean's trial were natural and were doubtless shared by her loyal subjects. How could the man be "not guilty" when she had actually seen him firing the pistol? Accordingly Parliament passed the Trial of Lunatics Act of 1883, which superseded the 1800 enactment and permitted juries to say in such a case "guilty of the act but insane at the time," a finding usually abbreviated into the words "guilty but insane." This is the verdict criticised by Lord Justice Atkin's Committee. The Committee did not press for the immediate repeal of the 1883 provisions, but definitely advised their amendment when opportunity occurred. So far from finding an opportunity for the amendment, the Government now proposes to stereotype the mistake. The Atkin Committee stated the terms of the necessary amendment, and the Army and Air Force (Annual) Bill provides the chance for military law to set an example to civilians.

ROYAL INSTITUTE OF PUBLIC HEALTH.

THE annual congress of the Royal Institute of Public Health is this year to be held at Bristol over Whitsuntide, under the presidency of the Duke of Bedford. The inaugural meeting will be held in the Great Hall of the University on the afternoon of May 19th and sessions of the sections will continue until May 21st. The week-end will be devoted to excursions in the neighbourhood, and on Sunday the delegates will accompany the Lord Mayor and Corporation of Bristol to the annual "rush" service at St. Mary Redcliffe. The congress will meet in five sections, and a promiscuous number of subjects is to be dealt with. The Section of State Medicine and Municipal Hygiene will hold discussions on Recent Legislation and the Problem of Human Tuberculosis of Bovine Origin (opened by Dr. W. G. Savage), on the Production and Distribution of "Grade A (Tuberculin-tested)" Milk (opened by Lieut.-Colonel C. Maddock, M.D.), and a number of other subjects. For May 21st it has arranged a joint meeting with the Section of Pathology, Bacteriology, and Biochemistry, when a discussion on Cancer will be opened by Dr. J. G. Adami. Other important topics to be dealt with by the Section of Pathology include the Pathology of Epidemic Encephalitis (Dr. J. G. Greenfield and others); Rheumatism (Dr. Carey Coombs), and the Pathology of Tuberculosis (Prof. Lyle Cummins). These subjects will be discussed by many speakers, and, in addition, there will be interesting papers by individual medical men. The Section of Industrial Hygiene is to hear papers on Silicosis by Prof. Edgar Collis, its President, Dr. Norman Tattersall, and Prof. E. H. Kettle. At a joint meeting with the Section of State Medicine Dr. R. A. Lyster will read a paper on Factory Hygiene as Part of Public Health, on which Sir Thomas Oliver and Dr. Arbour Stephens will speak. To this meeting there will also be contributed Studies on the Mechanism of Lead Storage and Excretion, from the Harvard Medical School, by Dr. Joseph Aub and Dr. Donald Hunter. On May 21st the morning session will be devoted to Ventilation of Factories and Vocational Selection. The Section of Naval, Military, Air and Tropical Diseases is to hear a paper by Surg. Captain R. J. Mackeown on the Standard of Public Health of the British Isles as revealed by the Navy Personnel of To-day, with Suggestions for Improvement; and also one on the Incidence and Prevention of Venereal Disease in the Royal Navy. This section naturally covers a large field, as also does that which is devoted to Women and the Public Health, whose chairman is Miss M. F. Townsend. Her presidential address will be devoted to the Care of the Crippled Child, and will be followed by papers on the Tuberculous and the Rheumatic Child by Dr. Owen Morris and Dr. A. P. Thomson, and a discussion in which Sir Henry Gauvain and others will take part. At the second session of the section Lady Barrett, M.D., will deal with antenatal organisation, and at the third Dr. Innes Pearce and others will speak on Racial Progress. The final session will be addressed by Miss May Smith and Miss Sheila Barrington on the Psychology of Women Workers, and on the Married Worker by Dr. Christine Murrell. General interest will certainly be felt in the proceedings of the congress, and it is expected that the attendance will be large. A fuller account of the programme and particulars of the facilities offered to members and their friends may be had from the hon. secretaries at 37, Russell-square, London, W.C. 1.

SMELL.

As Prof. Elliot Smith has often reminded us, primitive land animals lived in a world where perception must have been mostly dominated by the smells of things. In their evolutionary progress vision and hearing became relatively more important. In the higher animals all three are well represented, but in man smell has not made anything like the advance of the other senses, and indeed it seems now to be in much the same place as it was in his remote ancestors. Associated with this primitive condition is the fact that the mind of man has great difficulty in dealing intellectually with the sense of smell and what it perceives. In the *Glasgow Medical Journal* for March, 1926, Dr. J. L. Halliday has an interesting discussion of the position. At present we have not got even a qualitative scale of smells, still less any means for their quantitative measurement. The sense seems to be fatigued extraordinarily quickly, which makes its measurement very difficult by the minimal perceptible dose method which is the only one available. Smells are individual, and no smell seems to have a clear relation to another smell. And while any smell may have the most vivid associations in the mind with other circumstances—evidently the useful state in primitive conditions—the human brain has not yet risen to abstracting smells, so that they can be associated by similarity with one another. There is hence no scale or spectrum of smells, and smells may be said to have no intellectual value. Interest is being taken in various quarters in this sad state of affairs; there is an occasional periodical *Osmics*, and Mr. E. E. Free has an article in the March issue of the *Forum*, and we may look forward with confidence to the time when human ingenuity will denominate smells as it has colours. It is after all not so very long ago that the colour of blood could be described only as being blood-coloured, just as nowadays we can get no further than saying that blood smells like blood. Though, to be sure, people realised that blood is not very dissimilar in colour to some flowers thousands of years before they came to compare the smell of blood to the smell of anything else.

CONTROL OF URINARY INCONTINENCE BY THE GRACILIS MUSCLE.

EPISPADIAS in the female presents a difficult problem to the surgeon. Dr. Clyde Deming, in the *Journal of the American Medical Association* (March 20th, 1926), has recently described a case in which incontinence was satisfactorily controlled by transplanting the gracilis muscle to form a sphincter. His patient was a woman of 21, whose epispadias had been corrected at the age of 20 with marked improvement of the appearance of the external genitalia, but without change in control. She had a long flaccid urethra without any external sphincter, and only a minute trace of the internal sphincteric fibres. Young's method of operation gave her continence at night, but

still she could not hold her water when standing, and a third operation to diminish the calibre of the urethra gave no improvement. At the fourth operation the gracilis was incised between the two areas of nerve-supply and its proximal portion was wrapped round the urethra, sutured back on to itself, and fastened to the under surface of the pubic arch with fine double zero chromic sutures. The wound healed by first intention and the patient could walk about the ward after the third week without any dribbling of urine. The muscle tone was always good and was strengthened by exercises and by electrical treatment. A year later she was able to walk for two hours and to enjoy dancing and social life for the first time. The bladder remained under complete control. The results of other methods of operation, as reviewed by Dr. Deming, have not been very encouraging. He states that among the 30 cases recorded by Novè-Jusserand and Gotte only three patients were continent after operation, and there was no appreciable improvement in any of Steiner's series. The region of the perineum provides no muscles with normal sphincter action that can be transplanted into the neck of the bladder, nor are there any straight muscles that can be arranged around the urethra, as the rectus is arranged around a colostomy opening. The pyramidalis, he states, has been used unsuccessfully by Stetinger and Rubsamen, and Rubsamen and Bryosowsky have used the levator ani with some degree of success. One case has been recorded by Novwy of the successful transfer of the adductor and biceps muscles. Perhaps Dr. Deming's procedure will give more satisfactory results. The gracilis seems to be peculiarly suitable for transplanting; its easy accessibility, its double nerve-supply, and the high entrance of the nutrient vessels make the operation an easy one, and it is to be hoped that other surgeons will publish the results of cases treated by this method.

COLLIP'S PARATHYROID HORMONE.

IN the *Therapeutic Gazette* of March 15th O. H. Petty, W. H. Stoner, and H. W. Schaffer describe clinical application of the recent work of J. B. Collip. It will be remembered that Collip announced some time ago that he had succeeded in preparing an active substance from the parathyroid gland, which on injection caused marked rise in the blood calcium content of normal animals, also administration of this extract was found to cure the tetany of thyro-parathyroidectomised animals. He also noted that by repeated injections it was possible to kill the animals from hypercalcæmia, one of the symptoms being vomiting. In his original publications Collip described very briefly a few clinical tests with his material, but, as he stated, the value of the preparation could not be judged from these. It is very interesting, therefore, to turn to the first published account of a fairly extensive series of cases treated with this preparation. The authors use material made by the Eli Lilly Company. After reviewing the literature very briefly, they proceed to a description of the cases treated, composed mainly of infantile tetany, diabetes, and obesity. They conclude that administration of the hormone is of value in the treatment of infantile tetany, and in some cases of diabetes it is possible to reduce the insulin dosage when the parathyroid hormone is administered. They emphasise the fact that the preparation can never be used without very adequate control by means of frequent blood calcium estimations. As they point out, the estimation requires skill, and they recommend that all workers should employ the same technique since the various methods for the estimation do not yield strictly comparable results. In the same number of the *Therapeutic Gazette* there is an editorial comment on a paper by Lisser and Shepardson which appeared in *Endocrinology*, the authors having treated a case of tetania parathyreopriva with Collip's hormone. The case was a woman of 30 whose thyroid was removed for adenomatous goitre, and unfortunately three parathyroid glands were removed. Shortly after the operation the patient developed typical tetany. The patient was treated by injections of the hormone, and her blood calcium, which previously was low, returned to normal and the objective and subjective symptoms disappeared. They conclude that the material is a true specific.

POST-VACCINAL NERVOUS DISEASE.

THE international conference on small-pox, arranged by the Health Committee of the League of Nations at The Hague at the turn of the present year, decided to give close attention to the affections of the central nervous system reported in some countries to have followed vaccination. Dr. Levaditi had presented to the Paris Academy of Medicine some months earlier an account by three Dutch observers of 34 cases of post-vaccinal encephalitis (14 of them fatal) which had occurred in Holland over a period of 18 months. The Departmental Committee on Vaccination, appointed by the Ministry of Health, now invites the assistance of all members of the medical profession who are in active practice in this country in the elucidation of this question. The Committee has decided to make a special study during the next 12 months of all cases in which the occurrence of acute disease of the central nervous system (such as meningitis of any kind or origin, encephalitis, polio-encephalitis) has been "post-vaccinal"—using this term in the sense that the first symptoms have occurred within four weeks of vaccination. The object of the Committee is to obtain a collection of data sufficient to enable them to ascertain whether there are any features which distinguish cases of acute nervous disease which happen to be "post-vaccinal" (as defined above) from those which are not. The evidence so far available points to certain cases as having been due to encephalitis virus carried by the patient, the effect of vaccination being to activate a virus already present. The request which is therefore made to all practising members of the medical profession is that when called in to any case of disease of the central nervous system with an acute onset they will not fail to inform the Committee as soon as possible of every case in which they have ascertained that vaccination has preceded the onset of the symptoms within a period of four weeks. The intimation should be sent as speedily as possible to the Secretary of the Departmental Committee on Vaccination (Dr. J. R. Hutchinson), Ministry of Health, Whitehall, London, S.W. 1.

MULE-SPINNERS' DISEASE.[1]

EPITHELIOMA associated with mule-spinning in cotton mills has only been recognised generally within a very recent period, although in THE LANCET of Dec. 2nd, 1911, Mr. John Morley, the demonstrator of anatomy at Manchester, drew attention to the frequency with which a certain class of operatives suffered in this way. The ætiology of the condition was established by the work of Mr. S. R. Wilson, who in the course of an investigation into epithelioma of the scrotum collected a series of 40 cases from the records of the Manchester Royal Infirmary and the Christie Cancer Hospital which had occurred during the ten years previous to the publication of Mr. Morley's notes. The importance of the matter is now widely recognised, and in March of last year Sir William Joynson-Hicks appointed a committee of inquiry, with Sir Gerald Bellhouse as chairman, the other members being Prof. A. H. Gibson, Mr. F. Holroyd, Mr. E. Judson, Sir Thomas Legge, Dr. Archibald Leitch, and Lieut.-Colonel A. B. Smallman, Dr. S. A. Henry acting as secretary. The report of this committee has now been published and a leaflet has been issued from the Home Office simultaneously which sets out the facts for the consideration of all

[1] Report of the Departmental Committee appointed to consider Evidence as to the Occurrence of Epithelomatous Ulceration among Mule-spinners. H.M. Stationery Office. 1s.

concerned in the cotton industry. The fact that mule-spinners are liable to an affection of the skin which if not properly and promptly treated may become malignant is pointed out, and the need for the serious attention by these operatives to any small warts or ulcers on the skin that may develop in the neighbourhood of the scrotum is insisted upon. Any skin lesion of the part should receive prompt medical attention, since though all warts or ulcers do not necessarily become cancerous the risk is there and should be removed. Frequent washing with soap and water is enjoined in order to keep the scrotal skin healthy.

A leaflet on the subject of epitheliomatous ulceration in pitch- and tar-workers was issued recently from the Factory Department of the Home Office,[1] which contained substantially the same advice, and as this leaflet was widely circulated among mule-spinners it may be hoped that operatives are aware of the measure of the risks and the methods to avoid them.

THE King has promoted Lord Dawson of Penn, G.C.V.O., K.C.M.G., C.B., to be a Knight Commander of the Order of the Bath, and has appointed Sir Frederick Stanley Hewett, K.C.V.O., a Knight Commander of the Order of the British Empire.

WE are informed by the President of the Surgical Section of the Royal Society of Medicine that when Dr. W. E. Gye reads a paper on May 5th before the Surgical Section on the Origin of Tumours, Mr. J. E. Barnard will give a demonstration on Microscopical Methods.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Capt. R. H. Mornement to the *Vivid* for R.N. Barracks, Devonport.

Surg. Lt.-Comdr. W. J. Morris to the *Curlew*.

ROYAL ARMY MEDICAL CORPS.

Col. R. S. Hannay to be Maj.-Gen., vice Maj.-Gen. H. A. Hinge, who retires on retd. pay.

Lt.-Col. J. W. Langstaff to be Col., vice Col. R. S. Hannay (promoted).

Maj. and Bt. Lt.-Col. T. S. Dudding to be Lt.-Col.

ARMY RESERVE OF OFFICERS.

Lt.-Col. P. H. Collingwood having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

ROYAL AIR FORCE.

Flying Officer R. L. C. Fisher is promoted to the rank of Flight Lt.

Flight Lt. (Hon. Squadron Leader) E. Brown relinquishes his temporary commission on account of ill-health.

THE PARKES AND THE ALEXANDER MEMORIAL PRIZES.

The Parkes Prize, open to officers of the Royal Navy, Army, and Indian Army of executive rank on full pay, other than professors and assistant professors at the Royal Naval Medical School and of the Royal Army Medical College, is of the value of 75 guineas in money and a gold medal, and the subject for the next competition will be the Means of Spread and Methods of Control of Bacillary Dysentery. The Alexander Prize, consisting of £50 and a gold medal, is open to executive officers of the Royal Army Medical Corps on full pay, other than professors and assistant professors at the Royal Army Medical College. The subject for the forthcoming competition will be the Various Aspects of Inflammatory Middle-Ear Diseases with Especial Reference to their Relation to Military Service. Essays should be sent to the Hon. Secretary of the Prize Committee for the respective competitions, Royal Army Medical College, Millbank, S.W. 1, on or before Dec. 31st, 1928. Each essay is to have a motto, and be accompanied by a sealed envelope bearing the same motto and containing the name of the competitor.

[1] THE LANCET, Jan. 30th, 1926, p. 244.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CLXX.—THE TREATMENT OF TUBERCULOUS DISEASE OF THE SPINE.

APPROXIMATELY half the cases of tuberculous disease of the spine originate before the age of 5 years, about one-quarter between the ages of 5 and 10, the remainder with decreasing frequency as age advances after the age of 10 years. Spinal caries is, therefore, commonly a disease of childhood, a point of importance in both diagnosis and treatment. The lower dorsal and dorso-lumbar vertebræ are especially commonly attacked. Common predisposing causes are a tuberculous family history, infectious fevers, especially measles, and trauma. There is usually a latent premonitory period characterised by malaise, irritability, easy fatigue, general discomfort with absence of localised pain, cachexia, loss of appetite, and slight pyrexia. Sometimes an abscess forms without pain.

Early signs are the attitude and gait of the patient. Thus when resting the child may lean against some object, occasionally preferring to rest in the ventral position; he may support his hands on his thighs when standing or hold his head if the cervical region is attacked. Squaring of the shoulders, lateral deviation of the head, stiffness in walking or stooping, lordosis, and flexion of the thighs are not uncommon. Muscular spasm and rigidity are usually early marked features, and that before deformity arises. The gait is characteristically guarded, especially in disease in the dorsal region. Pain may be indefinite or absent or referred—e.g., pain at back of head, down arms, intercostal or stomach-ache, or growing pain in legs. It is usually subacute, but at times may be very severe. Occasionally it is starting in character. Pain may usually be elicited by pressure, especially on the transverse processes of the affected vertebræ. Jarring of the head, riding on a rough road, or even walking may cause discomfort or sometimes severe pain. Later angular curvature develops. The first signs may be abscess formation or paraplegia. Early X ray examination should be made in suspected cases. The importance of early recognition—i.e., before deformity arises—and early strict and adequate treatment cannot be too strongly emphasised.

It will be convenient to discuss treatment of tuberculous spinal caries under the headings of General, Local, and Adjuvant. Of these, local measures may be considered as supremely essential, while all are desirable.

General Treatment.

General treatment is concerned with considerations of climate, district, altitude, atmospheric conditions, diet, hygiene, educational and disciplinary measures, all of which deserve attention. Treatment in the country or at the seaside is to be preferred to treatment in towns. A mild but bracing climate is advocated, in a district remote from rivers or swampy grounds, and where the patient may remain out of doors during the greater period of the year. Institutional treatment in a suitable locality is better than treatment at the patient's own home, because constant skilled supervision is more readily obtainable, and also because the patient has the advantage of congenial companionship combined with suitable disciplinary and educational measures. Regular occupation adapted to the needs of a patient condemned to prolonged treatment is of the greatest moral benefit; association with cheerful companions who are themselves progressing towards a cure is encouraging, and helps the patient to realise that prolonged treatment is quite essential, even though he may feel well able to return to a life of normal

activity. In this country treatment south of the Thames is preferable to treatment elsewhere, because the climate is milder, outdoor treatment can be more easily obtained, and more sunshine is available. Inland treatment on the chalk downs, at a moderate elevation, is particularly good. Margate and the Isle of Thanet generally have achieved well-deserved popularity because of their bracing character and low rainfall. The southern coast of England is also valuable because of its high sunshine record, but the absence of chalk sub-soil on the coast and greater humidity renders the districts west of Portland less suitable than districts further east. In the winter months treatment in Switzerland at such places as Leysin is popular, the dry, clear air and high sunshine-value having many advocates. Generally it may be said that very young, elderly, or toxæmic patients are best treated inland. In patients responding well, with good physique and good reacting power, marine or mountain treatment accelerates the cure. In the majority of cases combined alternating inland and marine treatment is ideal.

Local Treatment.

Local treatment includes orthopædic measures which aim at the prevention or correction of deformity (as far as is possible in a tuberculous patient), and those surgical manœuvres which complications may necessitate. In acute or progressive caries of the spine three desiderata are called for: (1) dorsal recumbency to ensure rest of the body, (2) immobilisation of the spine, and frequently (3) hyperextension at the site of the disease to prevent the onset of deformity or reduce moderate deformity which may have arisen, and to relieve muscular spasm. Hyperextension is essential in dorsal and lumbar caries if deformity is to be avoided with any certainty. These essentials may be obtained in a variety of ways, of which the one especially favoured by me is the employment of the Berck board and jacket. A Bradford frame is also an admirable apparatus, largely employed in America, and increasingly so in this country. Pugh's frame, which is more elaborate, is very efficient. A plaster bed or a double Thomas splint has numerous advocates, but neither is so readily adaptable to the varying needs of patients, nor can varying hyperextension of the spine be so easily secured with these. In cervical caries the head and neck are usually immobilised by sandbags, but a plaster bed including the head and neck, a high plaster jacket or a box splint for the head with spinal board combined are more efficient. Recumbency with immobilisation should be continued until clinical signs of activity have disappeared and skiagrams indicate recalcification and increased clearness of outline of the affected vertebral bodies. Where paraplegia complicates the condition, head and leg extension is frequently indicated in addition, and often assistance is obtained by the occasional use of counter-irritants, as mustard plasters, at the site of the disease. If within three months the signs of paralysis have not notably abated, some decompression operation, such as aspiration of an abscess through an intervertebral foramen (Calvé's operation), laminectomy or costo-transversectomy, should be considered.

Considerable interest has been evoked during recent years by operations devised for the immobilisation of the spinal lesion. Of these, Albee's bone-grafting operation or a modification thereof is most often employed. It is generally agreed that such operations are rarely desirable in children, but may sometimes be usefully employed in adults. Even after these surgical procedures rigorous immobilisation for a prolonged period is essential if satisfactory results are to be obtained.

When dorsal recumbency is no longer indicated, it will be found advantageous to treat the patient in the ventrally recumbent position for increasing periods during the day, fixing his pelvis, placing a wedge-shaped pillow under the thorax, and encouraging voluntary dorsiflexion of the spine. This associated with fresh air and sunlight improves the dorsal musculature, and is of great value in lessening any subsequent tendency to deformity. When ambulatory treatment is commenced an initial period of three months or more fixation in a well-moulded plaster-of-Paris jacket provided with a large ventral window is of value, particularly if many vertebral bodies are affected. Subsequently a removable splint which will counteract the tendency to forward flexion of the spine and afford the spine protection is advocated. Such a splint may be constructed on a cast of the patient's spine, of celluloid or moulded leather, or else a brace, such as Taylor's or a modification thereof, may be employed. Personally I advocate a well-moulded celluloid jacket as most suitable. In cervical or cervico-dorsal caries a jury-mast or occipital and mandibular support may be needed in addition. Poroplastic jackets are hot, clumsy, and not very efficient. In cases of very marked deformity more elaborate measures for reduction of deformity than those described may be indicated.

Tuberculous Abscesses.

A common complication in tuberculous disease of the spine is abscess formation. Such tuberculous abscesses will sometimes absorb or calcify with efficient immobilisation. More frequently they tend to increase in size and should then be aspirated, with due antiseptic precautions, as soon as that is possible. Their spontaneous opening should always be prevented. Neither should they be evacuated by open operation if that can be avoided, as sinus formation and subsequent secondary infection is so frequent a sequela. The common situations for such complicating abscesses are in the iliac fossæ or in the dorsal or lumbar regions. In aspirating a psoas abscess the skin should be pushed inwards with the fingers of the left hand and the abscess grasped between the fingers and the ilium, on the outer side of which the thumb is firmly pressed. The trocar and cannula is then inserted just outside the iliac crest and passed into the abscess. The pus is then withdrawn by means of a special Record syringe. When the abscess has been emptied the aspiration puncture is sealed with gauze and collodion. The operation may have to be frequently repeated, but usually two to four aspirations suffice.

Adjuvant Measures.

Adjuvant measures of treatment include heliotherapy, artificial light treatment, aerotherapy, balneotherapy, vaccine therapy, &c. Of these, heliotherapy and artificial light treatment and aerotherapy have attracted much attention recently, and when judiciously employed are of undoubted help and value. Graduated sun treatment should be utilised whenever possible, assisted by or associated with artificial light when natural sunlight is not procurable. Such treatment accelerates the cure, increases the resistance of the patient to disease, diminishes the tendency to abscess formation, hastens recalcification, and often aids in the healing of sinuses if such exist. Exposure of the nude skin to cold air increases metabolic activity, and the combination of these adjuvant measures, especially when associated with sea-bathing in suitably selected cases, has a notable effect in toning up the patient and assisting in his cure. Vaccines are helpful in the treatment of sinuses recently secondarily infected, but in old chronic sinuses are of little value. Tuberculin has proved disappointing.

HENRY GAUVAIN, M.D., M.Ch. Camb.,
Medical Superintendent of the Lord Mayor Treloar Cripples' Hospitals and College, Alton, and Hayling Island, Hants, and of the Morland Clinics, Alton.

FOREIGN DECORATION.—Dr. A. Granville, C.M.G., C.B.E., late President of the Quarantine Board of Egypt, has been granted by the King licence and authority to wear the Order of Ismail (Insignia of the Second Class), which has been conferred upon him by the King of Egypt in recognition of valuable services rendered.

Special Articles.

AN ATTEMPT TO PROVIDE A STANDARD DEATH-RATE FOR BRITISH MERCHANT SEAMEN.

BY FLEET SURGEON W. E. HOME.

PART II.*

IN our endeavour to discover a standard death-rate for British merchant seamen in 1921 we have, so far, no figures from the Registrar-General to help us, but only those of the Board of Trade's Returns, which tell us the deaths that occurred on board and soon after discharge, but do not deal with those that happen later.

In our search we must first (1) follow the Registrar-General's method and get from the Returns for 1920, 1921, and 1922, an average of the deaths that occurred to seamen in their ships. Then (2) we get the number and ages of the seamen from the Board of Trade's Census of Seamen. Next (3) we find the average number of deaths, for the same years, of "All Males (England and Wales)" at their various ages, 15 to 70, rearrange these (4) to suit the grouping of ages in the Census of Seamen, and calculate the death-rates for each group. Then (5) we can find out the deaths to be expected from a population of the same number and with the same age distribution as the seamen, and at the average rates for "All Males, E. and W.," from all causes and from specified diseases and from accidents, when, comparing those due with those that occurred, we shall have some idea whether seamen, in their ships, have a mortality greater or less than the general male population, and in what degree. These are the principles of the tables that follow.

Table I. is extracted from the Returns for 1920–22, the figures being slightly rearranged when necessary. Deaths stated as in part attributable to drink are noted as due to alcohol, and the accidents are distributed into three classes, for which the Returns give facility, according as they result from casualties to ships, accidents on board, or accidents on shore. The total deaths are not so many as in earlier years (1901), injuries are many less, in part because there are so many fewer sailing ships.

Table II. is not printed separately as it is in fact the second column of Table V., showing the age-grouping of the British seamen enumerated (96,025) in the Census; as is remarked in the Return, this was taken in the middle of the coal strike (1921), and the number is less than the year's average; in order that the death-rate may not be stated too high, 100,000 has been taken as the figure representing the average number employed daily throughout 1921, in which year two million fewer tons of British shipping were cleared than in 1920.

Table III. gives the number of "All Males, E. and W.," in five-year periods from 15 to 70, and the three-year average of deaths in each group from certain specified and from all causes, and to the right, for each age-group, the deduced death-rate.

Table IV. shows the figures of Table III. rearranged to correspond with the age-grouping of the Census of Seamen, and the appropriate death-rates for "All Males, E. and W." when so grouped.

Table V. states the age-grouping reported in the Census of Seamen among the 96,025 seamen enumerated, and in the next column the numbers there would be at each age among 100,000; next, under each cause of death there are, to the left the death-rate (All Males, E. and W., from Table IV.) appropriate to each age-group, and to the right the deaths that would have been expected from the group accordingly. These deaths are summed up below, and the totals, being the deaths of each sort expected among 100,000 men, are 100 times the death-rate from each cause, and that death-rate is the standard death-rate we set out to find, being the number of deaths from each cause and from all causes that would be likely to occur among 1000 men of the ages seamen are, had their risk been that of the vast majority of Englishmen, those who live and work in England and Wales and are included in the Registrar-General's great group, "All Males, E. and W.," numbering about 12 million men.

But how many British seamen were there really, and how many were their deaths? The Board of Trade's Census of seamen, taken on June 19th, 1921, gives 96,000; the Board of Trade, in relation to its annual return, estimates them at 173,000; the Seamen's National Insurance Society puts the figure at about 138,000; while the National Sailors' and Firemen's Union thinks the figure should be about midway, more precisely they put it at 117,000; let us take the convenient 120,000 as the average number employed daily in 1921. What, then, about their deaths? They were in all 865 by Table I., and that is 90 per cent. of the average (950), so all the other averaged figures of deaths must be reduced by one-ninth to show deaths in 1921, when there were fewer deaths because fewer men were employed.

We have already seen in Table V. the deaths that would have to be expected among 100,000 seamen—a hundred times their standard death-rate—and these, multiplied by 1·2 (or a fifth added), give the deaths to be expected, at standard rates, among 120,000 seamen, which appear on the next line in the table. On the next line below that are the deaths that actually occurred among 120,000 seamen, distributed among diseases as was usual in the three years 1920, 1921, and 1922. The excess or defect from the expected is set out in the two lines below, whence we learn that employed British seamen in and about 1921, men we always suppose splendidly physically fit, had a death-rate from all causes 12 per cent. higher than "All Males, England and Wales," 10 times higher from enteric fever, 16 times higher from malaria, 180 times higher from small-pox, 50 times higher from alcohol, a dozen times from homicide, nearly double from suicide, and seven or eight times as great from accidents. On the other hand, for pneumonia, and "tubercle, other," their rate is less, five-sevenths, and from tubercle of the lung, only a fifteenth.

The standard death-rate for seamen was 6·435, but the actual death-rate of seamen employed on board ships was 7·20 per 1000, 12 per cent. greater, and, as we have seen, these figures take no account of men dying of disease or accident after discharge from their ships, even if the cause of their death had begun to operate before that discharge. In default of further information, which it is doubtful if any agency other than the Ministry of Health could collect, and that only after some years, the true death-rate of merchant seamen, even in their ships, cannot be exactly stated. In the endeavour to find an approximate figure some arithmetical calculation is necessary. In 1901 the death-rate for British merchant seamen by the Board of Trade's Return was, as we have seen, 13·72—the Registrar-General put it at 21·47. There is in 1921 a great reduction in the Board of Trade's figures, and the death-rate appropriate has become 7·20—a reduction of 48 per cent. The Registrar-General's table for 1921, when it appears, will not show a reduction so great; he deals with older men on whom the improvement in conditions on board ships will produce less effect, and whom the reduction in sailing ships and the accidents therefrom arising do not concern. Therefore his death-rate for seamen will not be so much lowered as will that extracted from the Board of Trade's Returns; let us allow him half of the improvement, from 100 to 76, that will bring down his death-rate for seamen from 21·47 to 16·17. The average then of his and of the Return's death-rates (their populations are sufficiently near) will be 11·68, which, in default of a better, is submitted as the most reasonable approximation to the true death-rate of British merchant seamen, in contrast with

* Part I. appeared in THE LANCET of April 17th, p. 828.

TABLE I.—CAUSES OF DEATHS OF BRITISH SAILORS IN THE MERCANTILE MARINE, 1920–22.

—	1920.	1921.	1922.	Total.	Average.
Cholera	4	6	3	13	4·3
Dysentery	11	11	7	29	9·6
Enteric fever	34	27	19	80	26·6
Influenza	21	2	10	33	11
Malaria	30	40	26	96	32
Plague	—	1	1	2	0·6
Pneumonia	67	56	41	164	54·6
Small-pox	8	4	3	15	5
Tuberculosis, all	29	19	34	82	27·3
,, lung	17	7	12	36	12
Venereal disease	—	—	—	—	—
Yellow fever	1	—	—	1	0·3
Other infective	19	12	20	51	17
Beri-beri	—	—	—	—	—
Cancer	6	2	5	13	4·3
Other general	3	—	7	10	3·3
Diseases of the—					
Nervous system	47	28	34	109	36·3
Circulatory	76	55	57	188	62·6
Respiratory	21	15	15	51	17
Digestive	63	38	38	139	46·3
Urinary	28	21	19	68	22·6
Other, unknown, &c.	26	18	23	69	23

—	1920.	1921.	1922.	Total.	Average.
Alcohol, acute	8	10	4	22	7·3
,, disease	2	—	—	2	0·6
,, homicide }	2	3	2	7	2·3
,, suicide }					
,, accidents	47	29	31	107	35·6
Heat-stroke	25	14	10	49	16·3
Homicide	10	11	5	26	8·6
Suicide	30	30	30	90	30
Casualties to ships	116	174	224	514	171·3
,, on board	161	143	153	457	152·3
,, ashore	127	89	113	329	109·6
—	1039	865	946	2850	950
Alcohol	59	42	37	138	46
Disease	511	362	374	1247	415·6
Accidents	469	461	535	1465	488·3
—	1039	865	946	2850	950

TABLE II.—Ages of merchant seamen not printed here. See second column of Table V.

TABLE III.—CAUSES OF DEATH, "ALL MALES, ENGLAND AND WALES," 15–70; AVERAGE OF THREE YEARS, 1920–22.

Age.	Population.	Enteric.		Malaria.		Pneumonia.		Small-pox.		Tuberculosis. All.		Tuberculosis. Lung.		Alcohol.		Homicide.		Suicide.		Accident.		Total.	
		No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R
15–20	1,727,823	38	0·022	1	0·0006	393	0·227	—	—	1,637	0·947	1,212	0·70	—	—	¼	0·002	47	0·03	630	0·36	4,901	2·84
20–25	1,448,385	34	0·020	19	0·013	444	0·306	½	0·0002	2,285	1·577	2,004	1·38	½	0·0002	7	0·005	95	0·06	604	0·42	5,447	3·76
25–30	1,339,960	23	0·013	28	0·021	522	0·390	—	—	2,020	1·507	1,817	1·36	3	0·002	2	0·001	109	0·08	529	0·39	5,418	4·04
30–35	1,281,320	25	0·019	32	0·026	675	0·527	½	0·0004	2,005	1·565	1,842	1·44	4	0·003	8	0·006	146	0·11	530	0·41	6,133	4·79
35–40	1,273,321	28	0·022	29	0·023	857	0·673	1	0·0008	2,239	1,758	2,098	1·65	15	0·012	9	0·007	219	0·17	597	0·47	7,755	6·10
40–45	1,223,054	23	0·018	20	0·016	993	0·812	½	0·0002	2,273	1,859	2,124	1·74	16	0·013	7	0·006	261	0·21	649	0·53	9·248	7·56
45–50	1,162,158	25	0·021	15	0·013	1,105	0·951	2½	0·0023	2,157	1,856	2,018	1·74	20	0·017	9	0·008	341	0·29	708	0·61	11,485	9·88
50–55	971,021	16	0·016	7	0·007	1,086	1·119	½	0·0007	1,739	1·792	1,629	1·68	19	0·020	8	0·008	347	0·36	711	0·73	13,587	14·00
55–60	781,608	16	0·020	2	0·002	1,133	1·450	½	0·0008	1,314	1·681	1,219	1·56	17	0·022	5	0·006	328	0·42	679	0·87	16,080	20·57
60–65	601,235	8	0·013	2	0·003	1,137	1·891	½	0·0005	914	1·520	843	1·40	10	0·016	3	0·005	305	0·51	609	1·01	18,558	30·88
65–70	449,363	10	0·022	4	0·009	1,160	2·610	1½	0·003	553	1·244	491	1·10	5	0·011	1	0·002	230	0·52	499	1·12	21,303	47·94
Totals	12,259,248	246	0·020	159	0·013	9,505	0·775	7½	0·0006	19,136	1·561	17,297	1·41	110	0·009	63	0·005	2,428	0·20	6,745	0·55	119,815	9·79

TABLE IV.—CAUSES OF DEATH, "ALL MALES, ENGLAND AND WALES," 15–70; AVERAGE OF THREE YEARS, 1920–22. REARRANGED IN GROUPING OF AGES AS IN CENSUS OF SEAMEN, JUNE 19TH, 1921.

Ages.	Population.	Enteric.		Malaria.		Pneumonia.		Small-pox.		Tuberculosis. All.		Tuberculosis. Lung.		Alcohol.		Homicide.		Suicide.		Accident.		All causes.	
		No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.
15–20	1,727,823	38	0·022	1	0·0006	393	0·227	—	—	1,637	0·95	1,212	0·70	—	—	4	0·002	47	0·027	630	0·36	4,901	2·84
20–25	1,448,385	34	0·023	19	0·013	444	0·306	½	0·0002	2,285	1·58	2,004	1·38	½	0·0002	7	0·005	95	0·065	604	0·42	5,447	3·76
25–35	2,621,820	48	0·018	60	0·023	1,197	0·457	½	0·0002	4,025	1·53	3,659	1·40	7	0·0027	10	0·004	255	0·097	1,059	0·40	11,551	4·41
35–45	2,496,375	51	0·024	49	0·020	1,850	0·741	1½	0·0005	4,512	1·81	4,222	1·70	31	0·012	16	0·006	480	0·197	1,246	0·50	17,003	6·81
45–55	2,133,179	41	0·019	22	0·010	2,191	1·026	3	0·0014	3,896	1·83	3,647	1·71	39	0·018	17	0·008	688	0·322	1,419	0·66	25,072	11·75
55–60	781,608	16	0·020	2	0·002	1,133	1·450	½	0·0008	1,314	1·68	1,219	1·56	17	0·022	5	0·006	328	0·420	679	0·87	16,080	20·57
60–65	601,235	8	0·013	2	0·003	1,137	1·891	½	0·0005	914	1·52	843	1·40	10	0·016	3	0·005	305	0·507	609	1·01	18,558	30·88
65–70	449,363	10	0·022	4	0·009	1,160	2·610	1½	0·003	553	1·24	491	1·10	5	0·011	1	0·002	230	0·517	499	1·12	21,303	47·94
Totals	12,259,248	246	0·020	159	0·013	9,505	0·775	7½	0·0006	19,136	1·56	17,297	1·41	110	0·009	63	0·005	2,428	0·198	6,745	0·55	119,815	9·79

TABLE V.—DEATHS EXPECTED AMONG 100,000 BRITISH MERCHANT SEAMEN AT THE AGES OF THE CENSUS OF SEAMEN (JUNE 19TH, 1921) AT THE AVERAGE RATES OBTAINING AMONG "ALL MALES (ENGLAND AND WALES)" IN THE THREE YEARS 1920, 1921, 1922; ALSO THOSE THAT OCCURRED.

Ages.	Numbers by Census (really Table II.)	Population adjusted.	Enteric.		Malaria.		Pneumonia.		Small-pox.		Tuberculosis, Lung.		Tuberculosis, Other.		Alcohol.		Homicide.		Suicide.		Accident.		All causes.	
			D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.	D.R.	No.
15–20	10,750	11,272	0·02	0·22	0·0006	0·01	0·23	2·59	—	—	0·70	7·89	0·25	2·77	—	—	0·002	0·022	0·027	0·03	0·36	4·06	2·84	32·01
20–25	18,712	19,620	0·02	0·39	0·013	0·25	0·31	6·08	0·0002	0·004	1·38	27·10	0·20	3·85	0·0002	0·004	0·005	0·098	0·065	1·27	0·42	8·24	3·76	73·77
25–35	30,550	32,032	0·02	0·64	0·023	0·74	0·46	14·73	0·0002	0·006	1·40	44·71	0·13	4·48	0·0027	0·086	0·004	0·128	0·097	3·11	0·40	12·81	4·41	141·36
35–45	19,808	20,769	0·02	0·41	0·020	0·41	0·74	15·37	0·0005	0·010	1·70	35·08	0·11	2·41	0·012	0·25	0·006	0·125	0·197	4·09	0·50	10·38	6·81	141·44
45–55	11,414	11,968	0·02	0·24	0·010	0·12	1·03	12·58	0·0004	0·005	1·71	20·29	0·12	1·90	0·018	0·21	0·008	0·096	0·322	3·85	0·66	7·90	11·75	140·63
55–60	2,548	2,671	0·02	0·05	0·002	0·005	1·45	3·87	0·0008	0·002	1·56	4·16	0·12	0·32	0·022	0·06	0·006	0·016	0·420	1·12	0·87	2·32	20·57	54·95
60–65	1,150	1,205	0·01	0·01	0·003	0·004	1·89	2·27	0·0005	0·0006	1·40	1·66	0·12	0·14	0·016	0·02	0·005	0·006	0·507	0·61	1·01	1·22	30·88	37·15
over 65	442	463	0·02	0·01	0·009	0·004	2·61	1·21	0·003	0·001	1·10	0·50	0·14	0·06	0·011	0·005	0·002	0·001	0·517	0·24	1·12	0·52	47·94	22·19
Not stated	651	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	96·925	100,000																						
Deaths expected among 100,000 seamen*			—	1·97	—	1·543	—	58·70	—	0·0286	—	141·39	—	15·93	—	0·635	—	0·492	—	14·32	—	47·45	—	643·50
Deaths expected } 120,000 seamen			—	2·3	—	1·8	—	70	—	0·034	—	170	—	19	—	0·76	—	0·6	—	17	—	57	—	772
" occurred }			—	24	—	29	—	49	—	4·5	—	11	—	13	—	41	—	7·7	—	27	—	439	—	865
Deaths of seamen } excess			—	10 T	—	16 T	—	—	—	180 T	—	—	—	—	—	54 T	—	13 T	—	14 T	—	7·7 T	—	12 %
on their ships } defect			—	—	—	—	—	—	—	—	—	1/12	—	1/7	—	—	—	—	—	—	—	—	—	—

* These totals are 100 times the standard death-rate for merchant seamen. T = Times.

6·435, their "expected" death-rate, which represents the much slower rate at which they would have died had they remained at work ashore instead of going to sea. In other words, they appear to die, between 15 and 70, nearly twice as fast (11·68) as their brethren of the same ages (6·43) in the general civil population. The death-rate of the Army in 1921 was 4·32, of the Royal Navy 3·58, and of the Royal Air Force 4·7.

This figure is no doubt in some degree an estimate, but perhaps no merely destructive criticism of details should be put forward, for it is submitted to the profession as not altogether unreasonable. It is submitted also that anyone dissatisfied, and thinking it worth while to say so, should produce a figure of his own and tell us how and why he chose it. That there should be an industry employing annually about 200,000 men under the British flag (say, 140,000 British, 10,000 foreigners, 50,000 lascars), as many men as there are in the British Army, and that the Government Department under which they work cannot give us a death-rate for them, and in years and years has never put out any important information about their health, can hardly be considered a credit to the Department concerned, the Board of Trade The Board's lightly borne responsibilities in this relation should be taken over (as the Royal Sanitary Institute has asked in each of these two last years, after its congresses held at Liverpool in 1924 and last year at Edinburgh) by the Ministry of Health, when they would be discharged with satisfaction to the profession, and with new benefits to the seamen, who deserve them.

INTERNATIONAL SURGICAL CONGRESS,

ROME, APRIL 6TH–10TH.

(FROM OUR OWN CORRESPONDENT.)

THE seventh Congress of the International Society of Surgery opened at Rome on April 6th under the patronage of H.M. the King of Italy and the presidency of Dr. DAVID GIORDANO (Venice); 366 members attended coming from all parts of the world, and there were 45 British representatives. The proceedings opened with the laying of a wreath on behalf of the Congress on the grave of the Unknown Italian Soldier. Then followed the inaugural meeting in the beautiful salon of the Capitol, presided over by H.E. Signor Benito Mussolini, in the unavoidable absence of the King. The meeting was animated and crowded; addresses were delivered by Signor Mussolini, by the Governor of Rome, Signor Cremonesi, by the President of the International Committee of the Congress, Prof. C. Willems (Liège), by Dr. Giordano, and by the General Secretary, Dr. L. Mayer (Brussels).

Signor MUSSOLINI in his address expressed the welcome of the Italian Government and spoke of the quality of mind and energy of character which must guide the work of the surgeon's hand. He claimed that the art of surgery first rose to the dignity of a science on Italian soil and spoke of the School of Salerno and the four master surgeons who arose from that school—Andrea Vesalio, Wurtzins, Paracelsus, and Ambrois Paré. He referred to his personal experience of the skill of surgeons in the war and said that, while soldiers may rest, there can be no rest from the war upon disease. A final word of cordial greeting concluded an eloquent address. The end of the gathering was marred by the untoward incident which I recorded last week. The excitement in Rome during the rest of the day was intense, and there was a great display of national flags and many processions. The Congress at its first meeting passed a resolution of great sympathy with Signor Mussolini.

Scientific Sessions.

The scientific sessions of the Congress were held in the library of the Royal Academy of Medicine at the Policlinico in Via Umberto I. The Policlinico,

a well-designed series of pavilions connected by corridors, is the principal hospital of Rome and contains about 1000 beds. The first session was devoted to a discussion on the Treatment of Uterine Cancer in which many speakers took part. Mr. S. FORSDIKE (London) gave his experience of radium treatment, and the general opinion seemed to be that where radical operation is impossible, radium and deep X ray therapy, both according to modern technique, are of great benefit. At the second session, on the afternoon of April 8th, the subject of discussion was the Treatment of Cerebral Tumours. Opening papers, either read or circulated, emphasised the value of early diagnosis and accurate localisation. Careful primary hæmostasis was insisted on and some speakers condemned "tourniquet" methods. The statistics of Mr. PERCY SARGENT (London) showed the most favourable operative results in cases of endothelioma; 19 successes in 31 cases of ablation. Dr. DE MARTEL (Paris) referred to the value of ventrilography. Many speakers advocated local anæsthesia. At this session a paper was read by Dr. A. W. ADSON (Mayo Clinic) on trigeminal neuralgia. He advocated a straight incision, showed how the motor root could be preserved, and concluded with a cinematograph film showing the sufferings of patients with trigeminal neuralgia. In the general discussion Mr. H. S. SOUTTAR (London) showed an ingenious instrument for opening the skull, the cutting instrument circling round a screw fixed in a trephine hole, and Mr. W. MARTIN (Cardiff) gave particulars of an intracranial sarcoma apparently cured by radium.

On the morning of April 9th the Congress discussed the Late Results of the Surgical Treatment of Jacksonian Epilepsy. In the opening paper Dr. R. LERICHE (Strasbourg) stated his belief that the disease is due to cortical cicatrisation following contusion, and recommended excision of the scar when possible. Otherwise he found radiotherapy and measures to maintain the equilibrium of the cerebro-spinal fluid of benefit. In the discussion which followed Mr. G. JEFFERSON (Manchester) described his investigation of the after-results in a series of cases of head injury and threw doubt on the traumatic origin of Jacksonian epilepsy.

The subject of the morning session on April 10th was the Surgery of the Spleen. It was opened in very thorough fashion by Prof. K. HENSCHEN (Zurich), who spoke of a large number of conditions in which splenectomy is of value. Dr. E. BEER (New York) gave operative statistics of splenectomy, showing particularly good results in chronic purpura. Prof. A. W. SHEEN (Cardiff) spoke of the use of radium emanation, radon, for reducing the size of the spleen before operation. Generally the discussion indicated the increasing range and value of splenectomy. The final session on the same afternoon was on the Treatment of Abscesses of the Liver. Opening papers were read by Prof. L. DOMINICI (Sassari) and Dr. P. PETRIDIS (Alexandria). The need for accurate diagnosis of the various causes of abscess was emphasised and also the value of emetine in amœbic abscesses.

All the sessions of the Congress were well attended and the difficulty of language was to some extent got over by the frequent use of lantern slides. Operations were watched in the various theatres of the Policlinico and elsewhere on the morning of April 8th. The theatre of Prof. R. Alessandri was crowded to see him do splenectomy, hysterectomy, gastrectomy for ulcer, retro-peritoneal, hydatid, and operation for hydronephrosis. The many who were present had a good view from a high gallery behind a glass screen. Spectators were interested in the use of mercurochrome solution for the skin and in a special gastric clamp. Arrangements and technique in all theatres excited admiration. Other operators were Drs. De Fabi and Margarucci at the Policlinico, Dr. Antonucci at the Ospedale San Giovanni, and Dr. Egidi at the Ospedale di S. Giacomo. At the former hospital avulsion of the phrenic nerve and cervical sympathectomy were performed. Instruments and appliances were exhibited at the Policlinico by Schaerer (Bern), Stille (Switzerland), G. Wolf (Berlin), Rizzol (Bologna), Invernizzi (Rome), and others. Operating tables, Putti's orthopædic table, mechanical bone-cutting instruments, and cystoscopes were features of the exhibition.

Social and Business Meetings.

The social and sight-seeing aspects of the gathering were complete and attractive. A warm welcome and much entertainment was given by the Italian surgeons to their colleagues. On April 9th the Italian surgeons gave a motor trip to Hadrian's Villa, followed by tea and concert at Tivoli. The Congress dinner on the evening of April 10th, to which ladies were invited, was also given by the Italian surgeons and was most successful; speeches were made by delegates from all the countries. The ladies of the Italian surgeons took the visiting ladies for several interesting trips.

At the business meeting on April 9th the Polish invitation to hold the 1929 Congress at Warsaw was cordially accepted. Prof. H. HARTMANN (Paris) was appointed president for the 1929 meeting. The question of readmitting German and Austrian surgeons to the Society was brought forward from Japan, and a resolution was passed in a crowded meeting, with six dissentients, which stated that "All the surgeons of the Central Powers who were members of the International Surgical Society before 1920 will be readmitted to the Society, if they accept the statutes of 1920, from the day when their respective countries join the League of Nations." The mention of the statutes of 1920 is unimportant, merely referring to an alteration in the subscription.

The international, scientific, and national committees were reappointed. The British National Committee is composed of Mr. J. E. H. Roberts (London), Mr. Percy Sargent (London), and Prof. A. H. Burgess (Manchester), Mr. Roberts being the delegate on the International Committee. Dr. Lorthior and Dr. L. Meyer (both of Brussels) were re-elected treasurer and secretary respectively. A ballot was held to decide the subjects for the next congress and the following three were selected, it being within the powers of the Scientific Committee to add others: (1) Causes and mode of production of embolisms; (2) Results of resection of the stomach for gastric and duodenal ulcers; (3) Treatment of Basedow's disease.

The Congress was a great success throughout; the kindness and hospitality of the Italian surgeons and the attractions of Rome were much appreciated. While no outstanding surgical advance was put on record, the scientific discussions showed a high standard of aim and achievement. A final word of admiration should be written of Dr. L. Mayer (Brussels), the Secretary-General, to whose work much of the success of the Congress is due.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

Vital Statistics for 1925.

THE French statistical bureau has just issued a provisional report showing for 1925 (as compared with 1924) somewhat fewer marriages, an increase of 17,000 births, more than offset by an increase of 29,000 deaths, and total mortality increasing during the nine last months of the year. Births exceeded deaths by 60,000. The birth-rate remains practically as in 1911–13, and French mortality is higher than that of neighbouring countries.

Reorganisation of the Military Medical Service.

Since the war the French Army Medical Service has confronted growing neglect and lack of enthusiasm, and the personnel is becoming insufficient. Prof. T. Tuffier, who is interesting himself in securing improvement, advocates close coöperation between civilian and military physicians, surgeons, and specialists, and

insists that all young men called up for military training should receive some practical instruction in medicine and surgery. His idea is that a medical reserve should be created which can be utilised in case of need. The provision of thorough scientific training in the colonies, better pay, relatively early retirement if desired, proper pensions, and the abolition of undesirable grade distinctions are amongst other things suggested for the encouragement of candidates for the service.

Experimental Treatment of Sarcoma with Lead.

To the *Comptes Rendus de la Société de Biologie* of March 26th N. Waterman contributes from the Laboratoire Anthoni van Leeuwenhoekhuis, Amsterdam, a short study of the effects of treating Rous sarcoma with lead. He used a combination of lead with unsaturated fatty acids. These soaps were only very feebly ionised, and it was difficult to get a stable emulsion. They were well tolerated by fowls on which the experiments were made, but not by rabbits, which succumbed to very small doses. The usual dose for intravenous injection was about 0·05 g. per kg. of body-weight. Chemical analysis of the organs showed a remarkably large deposit of lead in the lungs. These neoplasms, he states, generally cause death from pulmonary metastases, and it was found fowls treated with lead survived some 15–30 days longer than controls, as the metastases developed more slowly. It was noted that the tumours of the animals treated became much less virulent and that their transplantation was rarely possible after treatment. Waterman concludes that slightly ionised lead, in the form of an unsaturated soap, has an unfavourable effect on the sarcoma of Rous.

Conditions of Health in French Colonies.

The League of Nations has recently been studying the subject of tuberculosis in French colonies. In general tuberculosis does not show a tendency to spread in the African colonies, except in towns where the native manner of life has been altered. Alcoholism has diminished the native resistance to the disease. In Madagascar, Tanganyika, and the Sudan tuberculosis spreads more easily among natives living in earthen huts than among those inhabiting well-ventilated dwellings of bamboo and similar material. Tuberculosis in the French colonies is reduced by fresh air, ample light, wide spaces, and physical exercise, as it is elsewhere. The League of Nations has appointed a medical mission for the study of conditions in Senegal, the Sudan, French and Portuguese Guinea, Gold Coast, Ivory Coast, Liberia, and other regions of equatorial Africa, and this mission has just sailed from Antwerp.

Foreigners in French Institutions.

This vexed question continues to clamour for solution. Brandon has presented to the municipal council a plan providing for taxation of foreigners coming from countries not having sanitary conventions with France and for abrogating existing conventions which are unfavourable to France in the present situation. Varenne has pointed out that many of the foreigners are brought in by manufacturers needing workmen and that the manufacturers should share in the financial responsibilities thus created. The Director of Public Assistance has shown that no existing sanitary conventions are satisfactory with respect to the maintenance of foreigners in hospitals, homes, or asylums; these conventions provided only 672 francs for the year 1925, when the expenses incurred for foreigners amounted to 8 million francs. He believes that the best plan would be to prevent anyone with chronic or infectious disease from entering France. Plans for taxation are to be further considered.

Medicinal Plant Production.

A committee, which includes representatives of several Government departments, is studying the question of utilising wild medicinal plants growing in France and promoting their cultivation. It is proposed that premiums shall be provided for yields of good quality, and the plans include effective organisation of small growers.

Dr. M. Tiffeneau, professor of chemistry in the Faculty of Sciences of the University of Paris, has been appointed professor of pharmacology at the Faculté de Médecine. He has been agrégé in pharmacology, and his work is well known, including the synthesis of seneryl and other compounds.

The nineteenth French medical congress will be held at Paris in October, 1927.

A special committee organised by the Ministry of Public Instruction is planning to provide a system of examinations for determining vocational aptitude and capacity in children.

The appearance of a few cases of small-pox in the 15th arrondissement of Paris has caused the posting of warnings and advice to utilise the free vaccination services.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Signed Articles in the Public Press.

UNTIL recently the appearance in the daily press of articles on medical subjects was quite unusual, but of late years the situation has changed considerably. Editors have become aware that the public, which is accustomed to receive information on every aspect of social and scientific life, may have a legitimate objection to remaining in ignorance of medical matters. The staff of the leading papers therefore includes a medical assistant editor who gives accounts of medical events in a special column at regular intervals, reports on the proceedings of medical societies and congresses, and writes a special article whenever there is an interesting medical event. Apart from this everyday work done by the medical assistant editors, it is customary to ask eminent medical men to write signed articles on vital questions which stand in the forefront of public interest, such as birth control, prophylaxis against venereal diseases, or prohibition. The editors of the leading papers, advised by their assistant editors, take care that only medical men of high professional standing write in their columns, and exclude any who do it for the obvious purpose of advertising. Although, therefore, articles sometimes allude to particular kinds of treatment it has not hitherto been necessary to take any disciplinary action against a medical contributor to a daily paper.

Advice to Those About to Marry.

The importance of a medical examination before marriage has not yet received much recognition in this country. The only measure taken by the Government has been the distribution of a pamphlet in which the advisability of a medical examination is described; this is given to betrothed persons by the registrars before publication of the banns. Recently, however, the Minister of Public Health has issued a circular letter inviting the local authorities to appoint medical men for the examination of candidates for matrimony. The law does not allow any compulsion, and people decide for themselves whether they will undergo medical examination or not. Dr. Hirsch, discussing that question in the Berlin Medical Society recently, said that matrimonial certificates must answer the question whether marriage may be dangerous to the person examined, to the other partner, or to the offspring. The certificate should state whether the proposed marriage is permanently undesirable or whether it should be merely postponed. It must, of course, be left to the discretion of the betrothed whether or not they will follow the advice. Dr. Hirsch discussed the question whether only specially appointed medical officers should be authorised to act as matrimonial advisers, and said that although the average medical man has not at present quite enough knowledge of the very difficult questions which arise, a training in the laws of heredity and in the physiology, pathology, and sociology of marriage would prepare the next medical generation

for this work. In Dresden a non-official office was established some time ago by the lecturer of hygiene at the city's technical college for the purpose of advising present and former members of the college; but it had to be placed at the disposal of the general public owing to the demand. The clientèle of the office, indeed, included people of every class. Many of them came because they were aware of the great responsibility they were assuming by marriage; others because their intended wives or husbands had asked them to get a certificate. Men and women came in nearly equal numbers. The Dresden Sick Club has declared its readiness to pay the costs of matrimonial certificates given to its members.

German Qualifications in Roumania.

The Senate of the University of Bucharest has decided that medical students who have studied and qualified in Germany shall undergo an especially severe examination before being allowed to practise in Roumania. It is in explanation of this step that it is made easy in Germany for Roumanian candidates to pass the examination because only very few of them intend to reside in Germany; the universities are said to have no interest in a good training of Roumanians. The association of the German medical faculties has protested against these statements, saying that the German regulations do not allow any difference to be made between foreigners and Germans, and that the individual examiner does not know whether a candidate takes his qualification with a view of residing in Germany or in his own country. The medical faculties are the more astonished by the Bucharest decision, as before the war a large number of Roumanian medical men were trained at German universities without getting into any difficulties with the authorities at home.

Cultivation of Spirochæta Pallida.

Dr. Reiter lately reported to the Micro-Biological Society that he has succeeded in cultivating *Spirochæta pallida* in a fluid nutrient medium composed of rabbit serum and normal saline to which a piece of cerebral substance has been added. From the pure culture obtained he has produced a vaccine which gives a typical reaction on being injected into children suffering from florid syphilis and showing a positive Wassermann test. This reaction is absent, he found, in latent syphilis with a negative Wassermann test. He has tried the vaccine also in patients suffering from general paralysis, especially those who showed no improvement with other treatment, and the result was not only an amelioration of their general state but also the disappearance of the Wassermann reaction.

Anniversary of the German Surgical Association.

The German Surgical Association this year is holding its fiftieth annual meeting; it was founded in 1872, and has met every year since except from 1915 to 1919. At the time of the foundation the number of members was only 130, of whom two are still alive, including Prof. Küster, formerly of Marburg, who attended the recent meeting notwithstanding his advanced age. The present membership is about 2300. To mark the jubilee the meeting was held with great solemnity in the assembly hall of the Langenbeck Virchow House, the common property of the German Surgical Association and the Berlin Medical Society. After a musical introduction by the Berlin Medical Orchestra, the President, Prof. Körte, read an inaugural address comparing the state of surgery at the time of the foundation of the Society with that of present days. Congratulatory addresses were then read by the presidents of the Swiss, Swedish, and Norwegian Surgical Associations, and many congratulatory letters were received from other surgical associations and individuals in every part of the world. The City of Berlin has established an endowment fund for surgical research in honour of the Association. The leading medical papers have issued special numbers, of which that of the *Deutsche Medicinische Wochenschrift* is especially remarkable because it is composed exclusively of contributions by eminent foreign surgeons. The scientific proceedings of the meeting will later be noted.

Hispano-American Medical Society.

A society of the medical men of South America has lately been founded in Berlin under the name of Associacion Ibero-Americana, with the purpose of facilitating the study of medicine in Germany for medical men and students from Spain and South America and of making their stay in Berlin as agreeable as possible. It is remarkable that the diplomatic representatives in Berlin of several of the South American States are medical men. The Minister Plenipotentiary of Columbia was elected honorary president. and the Chargé d'Affaires of Salvador president of the society.

MEDICINE AND THE LAW.

Verdict of Negligence against Doctor for Certifying an Alleged Lunatic.

THE legal arguments in Harnett *v.* Fisher are not available for comment at the moment of writing, but after several days' hearing before Mr. Justice Horridge a decision has been reached upon the facts. It will be recalled that in 1924 Mr. William Harnett recovered the huge sum of £25,000 damages in an action before Mr. Justice Lush against Dr. C. H. Bond, a Lunacy Commissioner, and Dr. G. H. Adam, of West Malling, on the ground of alleged wrongful detention in an asylum for nine years. The House of Lords upset the judgment a year ago. Mr. Harnett has now sued Dr. Henry H. Fisher, of Sittingbourne (who with Dr. Penfold, since deceased, originally certified him on Nov. 10th, 1912, to be a lunatic and a proper person to be taken care of and detained under care and treatment), for negligence in having so certified him. The judge left two questions of fact to the jury: (1) Was Mr. Harnett insane when certified on that date? and (2) Did Dr. Fisher exercise reasonable care in certifying him? The jury has answered both these questions in the negative and has awarded £500 damages. Of the experts called in support of the plaintiff's claim, Dr. Theophilus Hyslop said he did not consider the facts, as set out in Dr. Fisher's certificate, sufficient; he would not himself have given a certificate on those facts. The statements set out were inter alia that Mr. Harnett rambled about religious matters, thought he had a call to rescue persons in Borstal institutions and to draw everybody to Christ, and was deeply absorbed in sexual questions. Dr. Hyslop did not regard these as a safe indication of insanity, nor did he think the certificate as a whole was sufficient ground for detention in an asylum. Dr. Risien Russell gave similar evidence, and expressed the view that Dr. Fisher could not have exercised sufficient care. On the other side, Dr. Fisher was able to call a considerable body of evidence, including the magistrate (Colonel Richard Locke, D.L.), who had signed the reception order and had known Mr. Harnett all his life; Dr. G. H. Adam (defendant in the former proceedings), whose opinion of Mr. Harnett's insanity at the material date was definite; Dr. Ludford Cooper; Dr. E. S. Pasmore, who received the plaintiff into Croydon Mental Hospital in February, 1913; and Dr. J. G. P. Phillips, physician-superintendent of Bethlem Hospital. The judge seems to have expressed an opinion that Mr. Harnett, if he had ever been insane, was now thoroughly recovered. Dr. Fisher, it seems, deliberately avoided exciting Mr. Harnett at the time by cross-examination on the subject of his religious views. There were indications during the recent trial that the learned judge thought the plaintiff should have been made as excited as possible by the certifying doctor in order that there might be no doubt about his condition. The case was, of course, under our law peculiarly a case for the jury, and the jury have given a verdict which, for the present, is final; but, as Mr. Justice Horridge stated in his summing-up, if juries handle this class of case amiss, great difficulty will be found in obtaining doctors to certify patients.

Dr. Fisher stated that the case of Mr. Harnett had not been brought to his mind from the date of the certification in 1912 until some ten years later. The judge agreed that it was a hardship for a doctor to be asked to remember particular cases after so long a lapse of time. The effect of the Statute of Limitations upon the plaintiff's claim is the main legal point upon which judgment has been reserved.

Dangerous Drugs Act Charges: Sentence of Imprisonment on Doctor Quashed on Appeal.

Dr. S. G. Connor has successfully appealed against the sentence of six months' imprisonment inflicted upon him at Marlborough-street police-court on four summonses under the Dangerous Drugs Acts and Regulations. The police-court proceedings were mentioned in this column recently, and the sentence of £200 fine and six months in prison (there being three awards of two months' imprisonment to run consecutively) was criticised as unusually severe. On appeal to the London Sessions Dr. Connor, who had pleaded guilty to the summonses in the court below, confined himself to attacking the sentence. It was protested on his behalf that the fines were heavy enough, but that the imprisonment was not a punishment which should be imposed upon a medical man for such an offence. Admittedly the appellant did not keep his books properly, but he had used morphine in a perfectly legitimate manner for the purpose of treating drug addicts, and it was claimed that in several cases he had achieved good results. Sir Robert Wallace, chairman of the appellate tribunal, announced that the bench thought Dr. Connor had been guilty of gross carelessness rather than wilful misconduct. The bench quashed the sentence of imprisonment, having regard to the whole case and to the effect of such a sentence upon a medical man.

It has been by no means uncommon for stipendiary magistrates' sentences to be reduced at sessions on appeal. It is unnecessary to discuss whether the stipendiaries have been generally too harsh or the sessions generally too lenient. But if it had been realised as likely that a medical practitioner for a first offence of this kind would receive a heavy fine and a sentence of six months' imprisonment, there would assuredly have been far stronger opposition to the details of the Dangerous Drugs legislation at its introduction.

EXHIBITION AT THE OPTICAL CONVENTION.

THE exhibition held by the Optical Convention in London last week gave evidence of great advance by British research workers and optical traders during recent years. There has certainly been a sincere attempt by British manufacturers to rival and surpass the work of their competitors on the continent, and, judging by the exhibits at the Convention, the attempt has proved fairly successful, at any rate in so far as the accessories of medicine are concerned. The ophthalmic section shows that practically all the optical instruments likely to be required by general practitioner or specialist can be got from British firms.

The apparatus now available for tests should make it possible to ensure that a lens or lens system fulfils the requirements of the instrument to which it is to be fitted, and should definitely prevent the use of any faulty lens system. In connexion with lens testing the universal lens interferometer exhibited by the National Physical Laboratory and built for them by Messrs. Adam Helger demands special mention. The exhibition of microscopes ranging from a simple folding model by R. and J. Beck, to elaborate microscopes for research and other special purposes, was particularly interesting as a contrast to the collection of microscopes in the historical section. Possibly a great deal still remains to be done, but with the improved methods of illumination now available—a new method of surface illumination, for example, was shown by R. and J. Beck—a steady approach is being made towards the theoretical limits of microscopy.

As a source of illumination for microscopic work the K. B. B. quartz mercury-vapour lamp exhibited by the Thermal Syndicate, Ltd., of Wallsend-on-Tyne, is worth mention. This lamp provides a source of illumination of absolute steadiness and great intensity and it is under complete control. Unlike most mercury lamps, it is not a vacuum lamp, but works under atmospheric pressure, and it requires no mechanical device for starting the arc. It may be operated off a 5 ampere plug in any direct-current house supply, provided that a series resistance is adjusted to suit the voltage. The spectral lines of mercury are well known, and, when fitted with a suitable Wratten light filter, the K. B. B. luminant provides a source of monochromatic illumination specially suitable for microscopic work in the visible, using the green mercury line (λ 5461), or for microphotography using the violet line. As a source of ultra-violet radiations the lamp has much to commend it.

The exhibits of glass manufacture show distinct advance. A recently published catalogue of the oldest established British firm of glass manufacturers describes 112 varieties as against 26 listed in 1914. It is claimed, moreover, that some of these types are far superior to continental glass. The opacity to various radiations is now known with certainty, and some interesting diagrams showing the colours and the intensity transmitted by various glasses were shown. It is now possible to make sure whether a glass is suitable for any given purpose.

Ultra-violet radiations have the property of causing many substances to fluoresce, and this may be used in several ways. One of these was suggested in the section of the exhibition devoted to illusions, when in the course of demonstrations of ultra-violet radiation pictures and diagrams which, when illuminated by daylight, were quite invisible became clearly visible when illuminated by ultra-violet radiations. They may also possibly be useful in analysis, and they are employed in distinguishing genuine precious stones from imitations, and to reveal marks which apparently have been obliterated. The source of artificial light in general use nowadays is the gas-filled incandescent lamp, and this is inconvenient because it alters the more delicate colours of pictures or fabrics. Artificial daylight units go far to get over this objection to electric light. Satisfactory illumination is very important, and many things are required of the ideal light. Its position, the avoidance of glare, and the intensity of illumination—these are daily problems; and some form of portable photometer, such as the Holophane Lumeter exhibited by Wray, Ltd., of Bromley, Kent, should prove useful to those concerned in the prevention of eye-strain.

Demonstrations of the Fournier d'Albe Optophone by Miss Mary Jameson aroused considerable interest. This instrument is designed to enable a blind person to read an ordinarily printed book. At a demonstration Miss Jameson was able to read part of a newspaper with comparative ease, and she claims to be able to read at a rate of about 60 words per minute.

DONATIONS AND BEQUESTS.—Mr. William Henry White, Earl's Court-square, S.W., left £1000 each to St. Dunstan's Hostel for the Blind and Dr. Barnardo's Homes.—Salford Royal Hospital has received a donation of £2000 and the Salford District Nurses' Home £400 from the Booth Charities. Other hospitals received £1310.—Mr. Samuel Meggitt Johnson, of Endcliffe-court, Sheffield, besides numerous other bequests, gave £1000 each to the Sheffield Royal Infirmary and the Sheffield Royal Hospital; £250 each to the Jessop Hospital for Women, Sheffield, the Children's Hospital, and the National Children's Orphanage, Sheffield; £200 each to the Tetley Orphanage and to the Crookes Orphanage, Sheffield.—Mr. Walter Southwell Jones, Marylebone-road, N.W., left a reversionary bequest of about £25,000 equally between King Edward VII. Hospital, Cardiff, University College Hospital, London, the Church Army, the Salvation Army, and the Y.M.C.A., London.

Correspondence.

"Audi alteram partem."

WHAT IS ORTHOPÆDIC SURGERY?

To the Editor of THE LANCET.

SIR,—Mr. Sampson Handley has chosen (THE LANCET, April 3rd, p. 734) to reopen the vexed question: "What is orthopædic surgery?" using as his text cases shown at the Orthopædic Section of the Royal Society of Medicine. Incidentally the illustrations chosen are singularly inappropriate to Mr. Handley's thesis. The first, Charcot's disease, is commonly treated by the use of some sort of supporting appliance, and the prescription of such an appliance is usually allowed, even by the most pedantic of general surgeons, to be part of the function of an orthopædic specialist. The second, osteomalacia in a child of 16, seems to come within the definition of "deformities arising during the process of growth." The third, secondary ovarian sarcoma of the scapula, was shown by the orthopædic surgeon to Mr. Handley's own hospital; I do not know whether it came from the orthopædic department of that hospital, or if so, by whom it was referred to that department.

But Mr. Handley's real point is something more serious. He would apparently go back to Andry's definition of orthopædics and restrict the orthopædic surgeon to the prevention of deformity in childhood. If he will read Andry's original book "Orthopædia" he will find that in this case the orthopædic surgeon should take over many of the functions of the skin specialist and of the beauty parlour. Present-day orthopædic surgeons cannot allow such a definition to stand; it is time that we stated our position quite definitely and made it clear what we do and what we intend to do.

As an orthopædic surgeon I consider that I am first a fully qualified surgeon in all branches of the subject, but finding that the whole of surgery is too large a subject to be dealt with efficiently by one man, I have given up certain large branches, notably abdominal surgery and surgery of malignant disease (excepting that of the bones), and have agreed to restrict myself to surgery of the bones, joints, muscles, and peripheral nerves, or more generally to surgery of the limbs and spine. This is the "implied bargain" that I made in taking up a specialty, and I think that it is one that is in the public interest. Mr. Handley's "implied bargain" seems to me to be in the interest, not of the public, but of the general surgeon. He would restrict the orthopædic specialty to a field so small that it could not possibly attract men with any ability or ambition. It was such a restriction that brought orthopædic specialists into disrepute 30 years ago when they were expected to confine their work to tenotomies, splinting, and the ordering of an appliance. Mr. Handley says nothing of the other side of the implied bargain. We often see the general surgeon unable to hold his hand when he has the opportunity to carry out such an orthopædic operation as an osteotomy or the correction of a hallux valgus. As a rule the actual operative procedure will then be carried out extremely well, but too often after the osteotomy the correction of the deformity and the fixation of the limb in plaster or in splints, the most important part of the operation, is left to the house surgeon. The hallux valgus is left without after-treatment, because the surgeon does not know that there is any after-treatment.

The real truth is that the general surgeon has almost ceased to exist; the nearest approach to one is to be found in the good provincial surgeon who, working in a smaller community, must be capable of carrying out all sorts of operative procedures with reasonable skill. In London most surgeons are really specialists—i.e., they possess special experience in particular branches of their work. A considerable proportion are specialists in abdominal surgery or in the surgery of malignant disease. It would be better in the interests of the public and of the profession if they would realise this and would acknowledge that there are sections of their work that they can do well and others in which they have little experience. It is not without reason that we hear so much of the work of the unqualified manipulator and bone-setter. Many of the conditions with which they deal are just those in which the orthopædic surgeon (in the present-day sense) is the only member of the profession to gain special experience. But the general surgeon pretends that he knows all about the treatment of a fracture, a sprain, or a muscle injury. Many general surgeons at the present day never handle a fracture themselves, and hardly any gain practical experience in the treatment of minor injuries. There are few orthopædic surgeons who are specialists; they would not for a moment claim that all the surgery of the limbs and spine should pass to them, but they do claim that having given up large (and incidentally remunerative) sections of surgery, they are able to gain a sounder knowledge of the remainder, and that they can thus assist their general surgical colleagues by their experience.

That there are some who think that this is true is, I think, shown by the fact that the Orthopædic Section of the Royal Society of Medicine is very well attended, and that many of those who come regularly are young general surgeons who have no intention of specialising strictly in orthopædic surgery.

I am, Sir, yours faithfully,

Portland-place, W., April 17th, 1926. R. C. ELMSLIE.

MINERS' NYSTAGMUS: A TENTATIVE THEORY.

To the Editor of THE LANCET.

SIR,—In the very complete and interesting article on miners' nystagmus by Mr. G. H. Pooley in your issue of April 10th, and in many previous articles which have appeared in medical literature on this subject, I am not aware that one possible cause of the condition has been given any consideration. I refer to the lowering to great depths at very high speed of those employed in the mining industry.

One statement in Mr. Pooley's article may be utilised to emphasise what I have in mind. He writes (p. 752), "... labyrinthine nystagmus, and nystagmus due to cerebellar lesions we know." In *diseases* of the labyrinth and of the cerebellum in addition to nystagmus we usually, I believe, get vertigo—i.e., sensations of uncontrollable abnormal movements such as of a falling forwards or sideways of the body as a whole. May it not be that the order of things can be reversed and that a sudden prolonged, uncontrolled, abnormal movement of the body as a whole in a rapid vertical descent through space may set up *functional disturbances* of the labyrinth and cerebellum and so produce nystagmus? In one of the local collieries with electrical winding apparatus the depth of 880 yards is reached in 60 seconds, or a virtual fall of the human body through space at the *middle* of the descent at the rate of about 35 miles per hour. Only in the mining industries does this abnormal vertical movement of the body occur and at such a rate.

Nature, I feel sure, in the genus homo, never provided for such an upset of the body equilibrium, and therefore I suggest that the cerebellum, the labyrinth, and the closely related eye muscles are seriously upset, that the effect of this is nystagmus, and that it does not wear off daily for many hours after reaching the pit bottom. Is it surprising then that Mr. Pooley states (p. 752): "Roughly, 50 per cent. of all actual coal-getters had gross oscillation of the eyes. . . . How many more would have had traces . . . "? Note the "How many more." Further, be it noted that Dransart's tests for the degree of nystagmus are made in the vertical plane of eye movements corresponding to a vertical fall through space. Again I am informed that the velocity at which the men are lowered is much higher nowadays than in the 'seventies

and to much greater depths. Might not this be the cause of the greater incidence in present times? If the rate at which the men are lowered is the cause of the disease, then the remedy is obvious.

There is such a pother as to whether deficient illumination or some toxic gas is the actual cause of miners' nystagmus that I humbly venture the above tentative theory, at least as a potent factor.

I am, Sir, yours faithfully,

J. PROSSER DAVIES, M.B., B.S. Lond.

Cardiff, April 16th, 1926.

THE NEW HEALTH SOCIETY.

To the Editor of THE LANCET.

SIR,—We are very grateful to you for your appreciative article and kindly criticisms of the activities of the New Health Society. I am sure you will realise the aim of this Society is to reach the mass of the public who are sadly lacking in the knowledge of the rudimentary laws of health. The motto of the members of our Council is simplicity. We do not consider that controversial or medical questions should occupy a very prominent portion in the pages of our *Bulletin*, believing the proper place for such matters to be the pages of THE LANCET.

In the early days of health propaganda, the necessary reiteration of the four primary laws of health of the body, as so simply and lucidly put by one of our Council, as fresh air, fresh water, fresh food, and a good drainage system, must have appeared monotonous to the instructed.

We are always pleased to receive kindly criticism from a journal so justly popular, not only with the medical profession, but also with the lay public.

I am, Sir, yours faithfully,

W. ARBUTHNOT LANE,

Sentinel House, Southampton-row, W.C., April 16th, 1926. President.

DIABETES, A RECOVERABLE DISEASE.

To the Editor of THE LANCET.

SIR,—I should like to congratulate Dr. Chapman and Dr. Percival upon the success they have had with patients who were treated upon the lines I advocated even before insulin was available in this country. In February, 1923,[1] I expressed the view that it was not hypoglycæmia that would prove the greatest danger when insulin could be given by all who practised medicine. The real danger would be the administration of too little insulin for the diet prescribed; this would lead to the sugar in the blood being kept at too high a level, and the pancreas would degenerate completely.

This prophecy has proved correct and has been the experience of those who have either adopted the view expressed by Prof. H. MacLean in May, 1923,[2] that diabetes mellitus is essentially a progressive disease, and therefore not attempted to keep the blood of their patients below some arbitrary percentage, or who have not had the facilities to do this. In February, 1925,[3] I published curves of the rise in the sugar in the blood after intravenous injections of sugar before and after courses of insulin which had rendered the patients hypoglycæmic for several weeks. These demonstrated an improvement in the sugar-burning and/or storing mechanism.

Although more than 450 cases of diabetes mellitus have been treated with insulin under my supervision, I should hesitate to express definitely the view that the disease is recoverable or that it is essentially progressive. The term diabetes mellitus is applied to several different conditions. The proof of this lies in the fact that some patients suffering from hyperglycæmia without any ascertainable infection do not react to insulin even when it is injected in enormous doses. Again occasionally, it is true rarely, a patient who has reacted to insulin loses the power of doing so; this loss may be sudden and not due to any infection that can be recognised at an autopsy.

One should be extremely careful not to confuse the issue by including in evidence in favour of recovery from diabetes mellitus any case in which there has been recovery from an infection. Cases of mild hypoglycopyresis appear to be suffering from true diabetes mellitus when absorbing toxins.

I am, Sir, yours faithfully,

Portland-place, W., April 14th, 1926. O. LEYTON.

[1] Brit. Med. Jour., 1923, i., 709.
[2] THE LANCET, 1923, i., 1039.
[3] Practitioner, February, 1925.

BLOOD-SUGAR IN ENCEPHALITIS.

To the Editor of THE LANCET.

SIR,—We have read with interest the article of Dr. McCowan and others (THE LANCET, April 17th, p. 802) on blood-sugar in encephalitis lethargica; the more so, as we have recently made similar investigations with entirely different results. Of the five cases in which, amongst other things, we studied the glucose tolerance, basal metabolism, and nitrogen balance, the first was of a boy recovered from the acute stage of the illness and without Parkinsonism and the other four were Parkinsonian in type; of these four, one showed pronounced stupor, two were typical examples of bradykinesia, and one was myoclonic. In all five the glucose tolerance, as shown by serial estimations of blood-sugar by the method of Folin and Wu, was definitely normal in type, without hyperglycæmia, and in one case (the stuporose) slightly suggestive of increased tolerance. In this last case, which appears to be similar to Dr. McCowan's case whose glucose tolerance is illustrated by his Fig. 4, the flatness of our curve is in marked contrast to his parabola. As determination of nitrogen and basal metabolism in these cases also gave normal results, the total N output being always less than intake and the basal metabolic rate showing very little variation from normal, we feel that our findings in the matter of glucose tolerance are, in some degree, confirmed.

We are, Sir, yours faithfully,

H. S. PEMBERTON.

Liverpool, April 19th, 1926. W. D. JEANS.

IONIC MEDICATION.

To the Editor of THE LANCET.

SIR,—In your annotation on Mr. Morphy's valuable paper on Ionic Medication in Dentistry, as well as in his paper, there is a point which I think should be corrected. The term "nascent" should be limited to the property shown by ions as they become atoms—that is, when they are about to give up an excess charge of electrons or are about to take up electrons to make up a deficiency. This occurs, as the primary or secondary effect of an electric current, at the contact of ions with metal or carbon electrodes with which they are not entering into chemical combination. There is no evidence to show that when ions form fresh compounds in the tissues there is any action due to a "nascent" condition. I believe Mr. Morphy adopted this suggestion from the paper by Dr. David Campbell, to which he refers. Dr. Campbell in that paper used the term "nascent" for conditions to which, in my opinion, it is not applicable.

I am, Sir, yours faithfully,

Devonshire-place, W., April 19th, 1926. A. R. FRIEL.

NEURITIS AND NEURALGIA.

To the Editor of THE LANCET.

SIR,—Your reviewer in last week's issue is "surprised to find no apparent description of, or reference to, metatarsalgia . . ." which he very kindly goes on to say appears to be the only neuralgic condition not described in my book. If he will turn to the last chapter on Neuro-Fibrositis, page 409, line 6, he will find the reference to metatarsalgia which he has overlooked.—I am, Sir, yours faithfully,

WILFRED HARRIS.

Wimpole-street, W., April 20th, 1926.

Obituary.

JOHN WILLIAM SMITH, M.B. EDIN., F.R.C.S. ENG., D.L.

Mr. J. W. Smith, who died at Ingleton on April 13th at the age of 61, was once a familiar figure in Manchester medical circles. He was the eldest son of Mr. Thomas Davidson Smith and was educated at the Friends' School, Lancaster, and at Lancaster Grammar School. Proceeding to the University of Edinburgh he graduated in medicine with first-class honours in 1886 and in the same year qualified as M.R.C.S. After a few months' study at Vienna he returned to England and went to Manchester in 1889 as junior demonstrator in anatomy under the late Prof. A. H. Young. His bent, however, was towards surgery, and having become F.R.C.S. in 1890 he was elected resident surgical officer at the Manchester Royal Infirmary, a post which he held for three years.

During the South African war he served for six months as honorary lieutenant in the R.A.M.C., and on his return in 1901 was elected assistant surgeon to the Manchester Royal Infirmary, becoming surgeon in 1910. Mr. Smith was also assistant surgeon at the Christie Cancer Hospital and visiting surgeon to the Charlton Union Infirmary. At the University of Manchester he became lecturer on operative surgery in 1904, and on the retirement of Prof. G. A. Wright in 1911 was appointed professor of systematic surgery. In this appointment he continued till 1922, when gradually failing health enforced his retirement. From his Edinburgh days he took a keen interest in the work of medical societies; in the year of his graduation he was president of the Royal Medical Society of Edinburgh, and at Manchester he was president of the Medical Society in 1919. For several years he acted as medical referee under the Workmen's Compensation Act, and his wide surgical experience and knowledge of compensation claims brought him the appointment of consulting surgeon to the Corporation Tramways Committee. Following his experiences in South Africa he directed his attention to military affairs at home, and for many years before the war was a lieutenant-colonel in the R.A.M.C. (T.F.), commanding the East Lancashire Field Ambulance. At the outbreak of war he was appointed commanding officer of the Second Western General Military Hospital, and as the number of institutions and beds increased it became his duty to oversee the administration of more than 160 hospitals with a total accommodation for some 16,000 patients. His services during the war were recognised by his appointment as deputy-lieutenant of the County of Lancaster. Mr. Smith's excellent training in anatomy was of the greatest use to him in his career. He devoted much attention to intestinal surgery, and especially to rectal carcinoma, which he treated with remarkable success. He was a careful and competent surgeon and his reputation in and around Manchester stood high.

In 1910 Mr. Smith married the daughter of Mr. Henry James Mason, of Holland Park, London, who survives him with one son and one daughter.

JOHN EDGAR PERCIVAL SHERA, M.D. BRUX.

Dr. J. E. P. Shera, who died at Wells on March 24th after a long illness at the age of 52, was educated at Dublin, took the Irish triple qualification in 1895, and graduated as M.D. at the University of Brussels in 1903. He held a number of asylum appointments, including that of senior medical officer to the Somerset and Bath Mental Hospital at Taunton, and was justices' visitor for Somerset under the Lunacy and Mental Deficiency Acts. After service with the R.A.M.C. at Salonica and in Russia he returned to England, and six years ago succeeded Dr. Pope as medical superintendent of the mental hospital at Wells.

Medical News.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.—At a quarterly meeting of the Council of the College held on April 15th, Sir John Bland-Sutton, the President, in the chair, the Walker Prize of £100 was awarded to Dr. William Ewart Gye in recognition of his work in advancing the knowledge of the pathology and therapeutics of cancer during the past five years. The award was made in pursuance of the following report from the committee appointed to advise the Council in the matter:—

"The work of Dr. Gye, which has been very materially assisted by the optical researches of Mr. J. E. Barnard, F.R.S., promises to throw light upon the hitherto unsolved problem of the causation of malignant disease. Taking as his starting-point the pioneer work of Peyton Rous upon fowl sarcoma, Dr. Gye produced from this tumour, by different methods, two fluids. Neither of these fluids when inoculated alone produced a tumour, but an inoculation of the mixed fluids in a healthy fowl was followed by the appearance of a sarcoma. The experimenter inferred in his further work that to produce a malignant growth two factors are necessary, first a living virus which appears to be of extreme minuteness, and secondly a chemical factor peculiar to each species of animal and effective only in that species. Dr. Gye has succeeded in cultivating this virus in vitro. Further, by a series of substitution experiments, he has shown that there can be obtained from human carcinoma and from malignant tumours of the rat and mouse a virus capable of acting with the 'specific factor' of the fowl to cause fowl sarcoma.

"These experiments, pursued with great patience and acumen over a long period and still in progress, suggest new and hopeful lines of attack upon the problem of the cause of malignant disease. Though it cannot yet be said that they have found practical application, they have already given to cancer research such a great stimulus, and such a new direction, as to justify the committee in recommending Dr. Gye for the Walker Prize."

The Cartwright Medal with an honorarium of £85 was awarded to Dr. James Sim Wallace, L.D.S., for his essay on Variations in the Form of the Jaws with Special Reference to their Ætiology and their Relation to the Occlusion of the Dental Arches. The subject for essays for this prize for 1926–30 will be the Ætiology, Pathology, and Treatment of Periodontitis (Pyorrhœa Alveolaris).—The subject for essays for the Jacksonian Prize for the year 1927 will be the Pathology, Diagnosis, and Treatment of Bronchiectasis and Abscess of the Lung.—Prof. Ernest W. Hey Groves, of the University of Bristol and the General Hospital, was appointed Bradshaw lecturer for the ensuing year.—Mr. George Buckston Browne, of London, and Mr. Thomas Herbert Bickerton, consulting ophthalmic surgeon to the Liverpool Royal Infirmary, were elected Fellows of the College.—Diplomas of member were conferred upon the following candidates who have passed the requisite examinations and complied with the by-laws:—

Eric L. Fothergill, Oxford and St. Thomas's; John Gray, Cambridge and Guy's; Alfred Hobson, M.B., Ch.B. Birm., Birmingham; Mustafa M. Raouf, Cairo and St. Thomas's; Sidney T. Seccombe, St. Thomas's; Charles C. Ungley, Durham.

Licences in dental surgery were also conferred upon the following:—

Cecil Fine, Cape and London; H. Schluchmann-Janssen, Cape and Royal Dental.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.—The following candidates have passed the Triple Qualification Examination:—

FINAL EXAMINATION.

Francis D. R. Wylie, Harry Ellison, Basil J. Hallion, David J. Allan, John L. Clark, Robert W. Schuch, John L. I. D'Silveira, Walter C. Heslop, Thomas D. Gould, Richard A. B. Leakey, Weliwattage Liveris Perera Dassanayake, Minnie F. Varley, Catherine Millar, Robert J. Snodgrass, Frank G. Sinclair, John Daly, Herbert C. V. de Silva, Edwin H. Eastcott, Nawalage John A. Cooray, John P. T. Mills, Max Camrass, George M. Johnson, Joseph Walker, Ellis Stungo, Charles L. E. P. Samarasekara, Charles E. Millen, and David Isaacs.

Medicine.—Ching Eng Toh, William Robinson, Graeme M. Macintyre, Peter D. Samarasinghe, Hewadewage Julius Fernando, Arthur G. Farquharson, John A. Mains, Arthur H. Edgar, Owain ap Vychan Jones, John B. Hutchison, and Emile Fischbacher.

Surgery.—Wilfred L. G. Jewitt, Arleigh W. Scott, Eric A. Y. MacKeown, Charles H. A. S. B. Panlickpulle, Hewadewage Julius Fernando, Ann J. Brown, Thomas M. Ormiston, Leo Checchi, James G. Currie, William Jackson, Archer W. Dunn, and Kanailal Palit.

Midwifery.—Carapiet Aviet Basil, Samuel A. B. Hosang, Ernest P. Tulloh, Thomas A. P. Wynter, Wilfred L. G. Jewitt, Peter D. Samarasinghe, Oswald D. Beetham, Charles H. A. S. B. Panlickpulle, David R. Wark, Ann J. Brown, Thomas M. Ormiston, Emma C. M. Muschamp, Leo Checchi, James G. Currie, Archer W. Dunn, Charles V. Harrison, Joseph R. R. Nicholas, Frederick T. Shadforth, Kudyar Marimuthu Rama Swami, George V. Boyle, John B. Hutchison, Edward C. Davies, and James T. M. Symington.

Medical Jurisprudence.—Robert J. Ormsby, Hugh N. Maclachlan, Duncan Gould, Robert G. Paul, George M. Johnson, George R. Gardner, Gerald M. Fox, Stephen E. W. Boland, William Robinson, Mohamad Mahmoud Farghaly, and John E. Mulholland.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.—At recent dental examinations, out of 26 candidates entered, the following 12 passed the Final Professional Examination and were granted the diploma L.D.S. R.C.S. Edin. :—

John H. E. Sanderson, Daniel A. Pauw, William P. Baxendine, Charles F. G. Reid, George F. Downey, Jacob S. Taback, Herbert F. Simpson, David S. Johnston, William Dyce, Ian G. Sutherland, Hector Archibald, and Isaac Stein.

The following candidates passed in the subjects of :—

Pathology.—David Dunnet, Edward L. Calder, and Richard V. P. Campbell.
Medicine.—Edward L. Calder, Margaret Leslie, Richard V. P. Campbell, and Hugh Linn.
Surgery.—Margaret Leslie, Richard V. P. Campbell, Thomas T. Jamieson, and Hugh Linn.
Dental Subjects.—John McAra.

THE Chesterfield Medal at St. John's Hospital for Diseases of the Skin and the London School of Dermatology has been awarded to W. Upton, M.B., Ch.M. Sydney.

INDIAN MEDICAL SERVICE DINNER FUND.—The annual dinner of the Indian Medical Service will be held at the Trocadero Restaurant on Wednesday, June 16th. Major-General Sir R. C. MacWatt has been invited to take the chair. Tickets and all particulars may be obtained from the joint hon. secretary, Colonel J. J. Pratt, 18, Nevern Mansions, Warwick-road, London, S.W. 5.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—The annual provincial meeting of the Fever Hospital Medical Service Group will be held at the Medical Institute, Great Charles-street, Birmingham, on Friday, April 30th, at 2.15 P.M., when Mr. F. Brayshaw Gilhespy will read a paper on Some Aspects of Ear and Throat Work in the Acute Infections.

BRITISH INSTITUTE OF PHILOSOPHICAL STUDIES.—Prof. Leonard J. Russell will give a course of nine lectures on Science and Philosophy on Tuesdays at 5.30 P.M. at Bedford College for Women, Regent's Park, beginning April 27th. Particulars of the course can be obtained from the director of the Institute, 88, Kingsway, London, W.C. 2.

PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—Mr. Neville Chamberlain, Minister of Health, will open the Society's pharmacological laboratories on Wednesday, May 5th, at 3 P.M. These laboratories have been established for the testing of the substances to be scheduled under the Therapeutic Substances Act, 1925. These include digitalis, strophanthus, ergot, pituitary extracts, and other drugs whose purity and potency cannot be determined by chemical means. The work will be carried on by the Society with the assistance of an advisory committee including Sir Humphry Rolleston, Sir Nestor Tirard, Dr. H. H. Dale, and Prof. W. E. Dixon. The director of the laboratories is Dr. J. H. Burn.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—On Tuesday, April 27th, at 2 P.M., Mr. Gwynne Williams will give a special afternoon demonstration in clinical surgery at the Royal Northern Hospital, to which all members of the Fellowship and General Course ticket-holders are invited. The last week of the course in urology at St. Peter's Hospital begins on April 26th; clinical work in the hospital will be available every afternoon, and a special lecture. The Royal Waterloo Hospital will hold a three weeks' course in medicine, surgery, and gynæcology, beginning on May 3rd, which will include lecture-demonstrations. On the same date a special course will start at the Central London Throat, Nose and Ear Hospital. This will be divided into two parts, clinical and operative, the latter occupying an hour and a half each morning. The two parts may be taken together or separately. On May 9th the Infants Hospital will begin a two weeks' course in diseases of infants, the first item being a morning visit on Sunday to the V.D. Centre, Thavies Inn, Holborn. On week-days the sessions will begin at 2 P.M. at the hospital. The Royal Westminster Ophthalmic Hospital is holding a course for the first three weeks of May, which will include clinical instruction daily at 2 P.M., and a special demonstration three times a week. Also from May 3rd to 28th there will be a course in psychological medicine at the Maudsley Hospital. Various forms of clinical instruction are open and special lectures will be given each afternoon. Between the same dates the London Lock Hospital will hold a course in venereal disease, with clinical work daily, and special lectures. Copies of all syllabuses, of the General Course programme, and of the *Post-Graduate Medical Journal* may be had on application to the Secretary of the Fellowship, at 1, Wimpole-street, London, W. 1.

ILLUMINATING ENGINEERING SOCIETY.—A meeting will be held at the house of the Royal Society of Arts, John-street, Adelphi, on Thursday, April 29th, at 7 P.M., when Dr. James Kerr will open a discussion on School Lighting: Modern Requirements and Recent Progress.

NATIONAL MILK CONFERENCE.—Under the presidency of the Minister of Health a conference on Milk in Relation to Public Health will be held in London on Tuesday, June 8th. It is convened by the National Clean Milk Society, and particulars of membership may be had from Miss J. E. Holland, 3, Bedford-square, London, W.C. 1.

TRINITY COLLEGE, DUBLIN: MONTGOMERY LECTURES.—Dr. T. Harrison Butler, of Birmingham, delivered two Montgomery lectures in Trinity College last week, his subject being the Clinical Use of the Slit Lamp. He had a large audience for both lectures, including many outside the ranks of ophthalmic specialists. He demonstrated the use of the lamp in clinical work at the Royal Victoria Eye and Ear Hospital during his visit.

SEAMEN'S HOSPITAL SOCIETY.—In a brief note which appeared in our last issue on the work of this society, the accidental omission of a line made it appear that the statement, "There are now two resident medical officers, the nursing staff has been enlarged, and the hospital has been recognised as a nurses' training school," applied to the parent hospital at Greenwich and not, as it should have done, to the Tilbury Hospital, which is a new branch of the society's work. At the Dreadnought Hospital itself there are five resident medical officers and, of course, a well-established training school for nurses.

THE LATE SIR SYDNEY RUSSELL-WELLS.—The presentation portrait of the late Sir Sydney Russell-Wells, painted by his nephew, Mr. John Wells, R.I., will be unveiled by Sir Humphry Rolleston in the staff room of the Dreadnought Hospital, Greenwich, at 3 o'clock on Tuesday, May 4th. The portrait, which has been subscribed for by friends and colleagues of Sir Sydney Russell-Wells, was on view at the Alpine Gallery in March. It represents him in his robes as Vice-Chancellor of the University of London. Any friends of the late Sir Sydney Russell-Wells who desire to be present at the ceremony may obtain cards of invitation on application to Prof. R. Tanner Hewlett, at the Seamen's Hospital, Greenwich.

UNIVERSITY OF LONDON.—Among the recently appointed teachers of the University are Dr. Leonard Hill, Captain S. R. Douglas, and Dr. H. H. Dale, who will be teachers respectively of Physiology, Experimental Pathology and Physiology, Pharmacology and Bio-chemistry at the National Institute for Medical Research.

Institution of University Chairs.—It has been resolved to institute, in accordance with the Regulations on University Titles, a Chair of Bacteriology and Immunology tenable at the London School of Hygiene and Tropical Medicine, and a Chair of Epidemiology and Vital Statistics tenable at the same school.

The *D.Sc. Degree in Statistics* has been conferred on Egon Sharpe Pearson (University College) for a thesis entitled Bayes' Theorem examined in the Light of Experimental Sampling (*Biometrika*, Vol. XVII., Parts 3 and 4, December, 1925).

It has been resolved to institute an *Academic Diploma in Anthropology*, and regulations therefor will be issued in due course.

Sir Holburt Waring has been appointed to represent the University at a meeting to be held this month, to consider the steps which should be taken to organise an appropriate celebration of the centenary of the birth of Lord Lister in April, 1927.

A course of three lectures on Fitness for Work will be given by Mr. T. H. Pear, professor of psychology in the University of Manchester, at the London School of Economics on May 31st, June 1st and 2nd, at 5 P.M.

Thomas Smythe Hughes Medical Research Fund.—The Senate will proceed shortly to consider applications for grants from this fund, which are allocated annually for the purpose of assisting original medical research. Applications must be received not earlier than May 1st and not later than June 15th next, and must be accompanied by the names and addresses of not more than two persons to whom reference may be made. Further particulars may be obtained from the Academic Registrar.

The *Rogers Prize* of the value of £100, open to all persons whose names appear on the Medical Register of the United Kingdom, will be awarded for an essay or dissertation on the Value of the Various Methods of Investigating Diseases of the Pancreas. Essays or dissertations, addressed to the Vice-Chancellor, must reach the University on or before April 30th. Further information may be obtained on application to the Academic Registrar.

MEDICAL GOLFING SOCIETY.—The final of the knock-out tournament will be played between Mr. Joseph Cunning, who defeated Squadron Leader A. J. Brown, and Dr. E. Ravensworth Hart, who defeated Dr. D. S. Gordon.

MAUDSLEY HOSPITAL, DENMARK HILL.—A series of six clinical demonstrations of Types of Mental Disease will be given at the hospital by Dr. Edward Mapother on Wednesdays, commencing May 5th, at 2.30 P.M. The syllabus will be found in our advertisement columns (p. 44).

Major-Gen. Sir Richard Luce, F.R.C.S., will preside at the annual meeting of the Medical Mission Auxiliary to the Church Missionary Society to be held at the Central Hall, Westminster, on Wednesday, May 5th. Tickets for admission may be had from the Loan Department, C.M.S., Salisbury-square, London, E.C. 4.

BRITISH SCIENCE GUILD.—The annual meeting of this Guild will be held at the Mansion House on Thursday, April 29th, at 4.30 P.M., when the speakers will be Lord Askwith, Dr. E. F. Armstrong, F.R.S., Captain P. P. Eckersley, M.I.E.E., and Sir Richard Redmayne. The programme includes addresses upon the coal-mining industry, dyestuffs, and broadcasting.

CONFERENCE ON MENTAL WELFARE.—A conference, arranged by the Central Association for Mental Welfare, will be held on Thursday and Friday, May 20th and 21st, at the Central Hall, Westminster. The subjects of discussion will be the Proper Care of Defectives Outside Institutions; Borderland Cases; The Training of Teachers for Special Schools; and Encephalitis Lethargica. Details may be obtained from Miss Evelyn Fox, 24, Buckingham Palace-road, London, S.W. 1.

UNIVERSITY OF LEEDS.—New premises have long been needed for the thriving school of dentistry which is a department of the University, the hospital work now being done at the General Infirmary. A site valued at £8000 has been provided by the authorities of the General Infirmary, and the Dental Board have promised a grant of £5000 if the balance of the cost of building is obtained from other sources. The sum of £2000 has already been received from the honorary staff of the dental school, and other subscriptions are invited to ensure early completion of the two-storey building, the designs for which have already been accepted.

VOYAGES D'ÉTUDES MÉDICALES (V. E. M.).—The nineteenth itinerary of the V. E. M. takes place from August 29th to Sept. 8th, Alsace-Lorraine and the Vosges being the districts visited. It has been organised by Dr. Maurice Gerst under the direction of Dr. Paul Carnot, professor of therapeutics in Paris, Dr. Harvier of the Hôpital Bicêtre assisting. In the course of the journey, which commences at Nancy, Strasbourg, Colmar, Plombières, Contrexéville, and Vittel will be visited, while opportunities will be given while at Nancy for an inspection of the battlefield of Verdun. The total cost for the expedition, which is restricted to doctors and senior medical students, has been fixed at Fr.1050 for travellers from countries where the exchange in high, and Fr.650 for participants where the exchange is low, these figures including all expenses—hotels, railway tickets, and motor-cars—from Nancy, the starting-point, to Vittel the place of disbandment; moreover, there will be a reduction of 50 per cent. to medical men and their wives on the French railways from the frontier to Nancy and back to the frontier from Vittel. British doctors desirous of participating should communicate with Madame Juppé-Blaise, representative of French spas, at the Office Français du Tourisme, 56, Haymarket, London, S.W.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 10TH, 1926.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 190 (last week 130); scarlet fever, 1483; diphtheria, 919; enteric fever, 45; pneumonia, 2074; puerperal fever, 57; cerebro-spinal fever, 7; acute poliomyelitis, 3; acute polio-encephalitis, 2; encephalitis lethargica, 47; dysentery, 6; ophthalmia neonatorum, 99. There were no cases of cholera, plague, or typhus fever notified during the week. The apparent increase in small-pox may be illusory, for this week and the last embraced the period of Easter when postal notification is impeded; the mean of the two weeks is below the figure of the previous week.

Deaths.—In the aggregate of great towns, including London, there were 6 (1) deaths from enteric fever, 100 (45) from measles, 6 (1) from scarlet fever, 55 (5) from whooping-cough, 45 (11) from diphtheria, 45 (12) from diarrhœa and enteritis under 2 years of age, and 294 (74) from influenza. The figures in parentheses are those for London itself. The notified deaths from influenza are 71 in excess of the previous week. The number of measles deaths has now reached 100 for eight weeks in succession.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

THE ECONOMY BILL: MEDICAL BENEFIT.

ON Tuesday, April 13th, the House went into Committee on the Economy (Miscellaneous Provisions) Bill. Mr. JAMES HOPE was in the chair.

On Clause 2, which deals with the administration of medical benefit under the National Health Insurance Scheme,

Sir R. HAMILTON moved an amendment to reduce the sum of 3*d.* in respect of the expenses of the Minister to 1*d.*, which would mean, he said, a saving of about £120,000 to the societies. He understood that the actual expenses incurred by the Minister included 1*d.* per person for regional medical officers and the central committees. It had also been indicated that there were other costs to the approved societies in connexion with the printing of stamps which he understood had hitherto been a departmental charge. He should like to know whether this extra charge was also to be put on the approved societies. He thought the Committee ought to know what the charges actually amounted to, and whether the sum of 3*d.* was not considerably in excess of what was required.

Mr. N. CHAMBERLAIN (Minister of Health) said that in this question there were included only two kinds of expenditure. One was connected with the regional medical officers, and the other was the expense incurred in connexion with the central committees. The proposal to reduce the amount which might be paid to the Minister from 3*d.* to 1*d.* was based upon no logical foundation. It was not suggested by the hon. Member that 1*d.* would cover the cost of these two services, and what he was asking the Committee to do was to make a present to the approved societies of the difference between 3*d.* and 1*d.* and throw the portion of the charge which had hitherto rested on them on to the Exchequer. He could not accept the amendment.

Mr. J. H. THOMAS supported the amendment on the ground that it was an attempt to prevent the Government continuing their policy of bleeding the approved societies. Surely they had reached a stage when the Minister might make a concession.

After further discussion Mr. CHAMBERLAIN moved the closure, which was carried by 221 votes to 139. The amendment was then rejected by 220 votes to 142.

Mr. MACKINDER moved an amendment to postpone placing the cost of medical benefit on the approved societies until 1928. He said that a fortnight ago the Government had carried a proposal to rob the insurance fund of £2,800,000; now they were trying to put an extra cost on the approved societies of £2,000,000. The amendment would give the societies an opportunity to look round. One could argue—and he felt almost inclined to argue—that the position of the medical men was being made quite safe by Act of Parliament. He had taken part in the early negotiations when they tried to arrange terms with the doctors. They were now going to reach the magnificent sum of 12*s.* per year per member. He would like to go into other questions such as the drugs the doctors prescribed, but he feared it would be out of order to do so.

The Deputy Chairman (Captain FITZROY): I cannot see what this argument has to do with the question of postponement.

Mr. MACKINDER said he was trying to show the Committee that it was extremely wrong to give the doctors by Act of Parliament at least 12*s.* per year per member. At all events they ought to give the approved societies an opportunity of realising on a 12 months' experience what the effect of this Bill was going to be.

Mr. THOMAS was speaking in support of the amendment at 11 o'clock when, according to the rules of the House, the chairman left the chair to make his report to the House.

Health Insurance in the Services.

On Wednesday, April 14th, the House considered on report a financial resolution in connexion with the Economy Bill, which enables the Government to appropriate the sum of £1,100,000 from the Navy, Army, and Air Force Insurance Fund. On the motion "that the House doth agree with the Committee in the said resolution,"

Mr. RAMSAY MACDONALD said that when he listened to the speech of the Secretary of State for War on the Committee stage, he really wondered if he were attending a meeting of the Soviets in Moscow. The arguments were exactly the same as one would expect to hear there when they were confiscating private property. The State was in need and the State in need dominated everything else. As a matter of fact, the country was in a peculiar position at the present time. It had got a Jacobin as Chancellor of the Exchequer, and as he wanted to balance his Budget he was adopting the

principles of Lenin. He had persuaded the Minister of Health to take the position of Zinovieff, and he was asking the Secretary for War, who was doing his best, to fill the shoes of Mr. Trotsky. It was perfectly clear that if the Chancellor of the Exchequer had not been afraid to do it he would have invaded the actual surpluses of the approved societies. But here he was actually putting his hand into the pool and taking from it an accumulation of £1,100,000. There was absolutely no ground for doing this except the most miserable attempt to differentiate between this Fund and the funds of other approved societies, which could not be substantiated by anyone. Those who voted for the Government's proposal were going to declare that if the State found contracts inconvenient it could break them without even consulting the people with whom those contracts had been made.

Sir L. WORTHINGTON-EVANS (Secretary of State for War) said there was nothing in this measure which was in any sense at all a confiscation of property belonging to any individual whatever. This Fund was not an approved society; it was not managed by the members, and no member had any right of membership at all. It was a Fund created by the Government under an Act of Parliament for the purpose of providing benefits for those serving men who were unable to join approved societies. There were 23,000 entitled to benefit under this Fund. There were, as a matter of fact, about 160,000 serving men who were paying contributions, but only on an average 400 out of those who left the service every year joined this Fund because of their impaired health. The rest of them joined the friendly societies, and if the improvements, which were part of the Government plan to-day were fully carried out, they would go into those societies fully paid up without having to wait until they were entitled to benefit. This Fund was a Government guarantee of benefit, and the members were not entitled like members of approved societies to normal benefits and additional benefits. They were specifically prevented by Act of Parliament from having additional benefits at all. The actuary had certified that not merely the £1,100,000 which was being transferred, but the whole £1,500,000 was surplus to the requirements of the Fund—i.e., to pay the benefits to which the members were entitled. The surplus arose from the excessive contributions paid in by the Government in either one or other of its capacities. £400,000 was being set aside as a reserve against the liabilities for the additional benefits which the soldiers, sailors, and airmen were getting under these proposals—not the limited benefits to which they had been entitled in the past, but an additional benefit equal to the average of the approved societies. It was absurd, therefore, to talk about confiscation. It was done for party political purposes and with the obvious intention of creating dissatisfaction in the Forces of the Crown. The truth was that these men, far from being unfairly treated, were getting greater benefits under this Bill than were given to them by Mr. Lloyd George under the original Act.

After further discussion Sir L. WORTHINGTON-EVANS moved the closure which was carried by 240 votes to 144. The resolution was then agreed to.

The House then went into Committee on the Economy (Miscellaneous Provisions) Bill, and continued the discussion of Mr. Mackinder's amendment to Clause 2, which was interrupted on the previous evening.

Mr. N. CHAMBERLAIN (Minister of Health) said they had been told over and over again that this was an unjust charge in spite of the fact that the approved societies themselves, through the Consultative Council, recognised the justice of their meeting out of their funds the cost of medical benefit as well as other benefits. The position was really this. Under the main Act there was provided 9*s.* 6*d.* plus 6*d.*, making 10*s.*, as the cost of medical benefit and administration expenses. Now that would be entirely insufficient. It was necessary in 1924 to make some arrangement under which the difference between this 10*s.* and the actual cost of medical benefit and administration expenses should be met. There were negotiations and discussions between the Government and the approved societies. He understood that the approved societies were asked to meet this difference out of their benefit fund and they refused. Finally a way out was found by taking from the Unclaimed Stamps Sales Account certain moneys which were unused and utilising those moneys to make up a difference between the amount provided under the Act and the actual cost of the benefit and administration. That arrangement was embodied in an Act passed in 1924 called the Cost of Medical Benefit Act. Under that arrangement the full cost of those expenses had been met up to the present without making any charge on the Exchequer. Part of it had been provided out of the benefit funds, and the other out of these unclaimed stamps. The effect of postponing this clause would be that there would be no statutory provision for the difference between the cost and the 9*s.* 6*d.* and 6*d.* provided for in the Act of 1924. The amendment would mean that the whole scheme would come to an end. That was an impossible position. If hon. Members thought that they could continue to make up this difference out of the same fund which had hitherto made it good, he could assure them that that was not the case. The fund would be exhausted by the end of the year, and unless this clause was passed in its present form the whole scheme would be thrown into chaos and disorder and they would have to begin again and try to find some new arrangement.

After further discussion, Mr. CHAMBERLAIN moved the closure, which was carried by 245 votes to 139. Mr. Mackinder's amendment was then negatived by 244 votes to 144.

Allocation of the Composition Sum of 13s.

On the motion that Clause 2 stand part of the Bill,

Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health), replying to questions, said that there was a special provision for Scotland in Clause 2. In the sum of 13*s.* there were two items which particularly affected the sparsely populated areas of Scotland. One might be called the expenses for the mileage of doctors. In allocating the 13*s.*, inasmuch as in Scotland the drug bill was less than in England, the clause allowed a special assistance to be given to medical men in particular areas in Scotland which were sparsely populated. That was over and above the amount given in England, and the necessary adjustments were made to keep it within the sum of 13*s.* This provision was put in at the request of the Scottish societies in order that further arrangements might be made with the medical men in that country to meet their special difficulties.

Mr. LLOYD GEORGE asked if the sum of 13*s.* under this clause represented the amount which the Minister of Health had decided should be paid to the doctors, or was it merely a maximum which had been put in for the purpose of complication without consulting the people who were primarily concerned at all and who had to pay it. On the other hand, if it was merely a figure to form the basis for negotiation, what folly to put in this sum at all! That was not a good way to start negotiations. He also wished to know whether the money which had been allocated to the Highlands of Scotland was money to which the Government were contributing 6*d.* in addition to what they were giving now, or whether on the contrary they would not be relieved of the part of the £2,800,000 to which they were contributing at the present moment.

Mr. N. CHAMBERLAIN said the sum of 13*s.* was a composition sum and included the composition fee which was the subject of agreement with the doctors; 9*s.* went to the doctors out of the 13*s.*

Mr. LLOYD GEORGE: What is the present amount of the composition sum?

Mr. N. CHAMBERLAIN: Ten shillings is the comparable amount, and the extra charge which comes out of the fund is the difference between 10*s.* and 13*s.* Continuing, the right hon. gentleman said that the 13*s.* was made up as follows: There was 9*s.* for the doctors, 4½*d.* for mileage charge, 2*s.* 9*d.* for drugs, 6*d.* for the expenses of the insurance committees, and 3*d.* for the Minister of Health in respect of regional medical officers and central administration. That made 12*s.* 10½*d.* There was a margin of 1½*d.* which was put in because, as was pointed out in the report of the Royal Commission, the cost of drugs had been rising in the past and there was no guarantee that they had reached finality in that respect. But it was provided in the proviso of Clause 2 that "if the aggregate sum paid for any year to insurance committees and the Minister under this section in respect of each of the total number aforesaid is less than the sum applicable as aforesaid in respect of each of the said total number, the balance shall be carried forward and be treated as being applicable as aforesaid in any subsequent year." So that nothing was lost if the margin was carried forward. It would be seen that this 13*s.* was nearly related to the actual cost of medical benefit, and was, in fact, a strict following of the recommendation of the Royal Commission, and while statements had been made as to the consent of the Consultative Committee to this proposal, the approved societies themselves did not consider that these benefits chargeable to the funds of the societies were in any way unreasonable.

Mr. WHEATLEY said that while the Minister of Health was very careful to shelter himself behind the recommendations of the Royal Commission when he was dealing with one part of the measure, he carefully ignored the fact that he was running directly contrary to the recommendations of the Commission in this particular section of the Bill which the Committee was discussing. He was heaping up expenses on the societies; he was diminishing the State contributions to the societies, and in that way he was preventing the societies from carrying out the policy of additional benefits, which was one of the main recommendations of the Royal Commission. Another thing which the right hon. gentleman carefully ignored was the fact that while certain interests, including the medical profession, were

to get more, the whole of that additional expenditure was to come out of the pockets of the poor.

Mr. CHAMBERLAIN: Does the right hon. gentleman say that the medical profession are to get more in consequence of this clause? If so, that is a misunderstanding.

Mr. WHEATLEY: They are to get more than they would have got out of the old contributions to the societies.

Mr. CHAMBERLAIN: Not more than they are getting now.

Mr. WHEATLEY said that was so, but the sum which the doctors were getting now was the sum fixed while this matter was being discussed by the Royal Commission, and the settlement of this point was one of the things which gave rise to the appointment of the Commission. The doctors could not continue to receive the sum they were getting now out of the amount now being paid by the insured people, and therefore in order to save any reduction of the additional sum put on during the past two years for medical services, the right hon. gentleman took the other course and increased the amount to be paid by the insured people to a sum that would enable the demands of the other section to be met. This showed that they were taxing the poor to give additional remuneration to the medical profession. He was not arguing that the doctors were not entitled to the additional remuneration, nor that the 9*s.* capitation fee was too high, but he was arguing that it was unfair, when it was decided to increase the capitation fee, to include in the same provisions proposals not for an additional Government grant, but proposals to reduce the existing Government grant, which was based on a lower capitation fee than the one now being paid. That was a real injustice.

Mr. N. CHAMBERLAIN moved the closure, which was carried by 191 votes to 110. The clause was then added to the Bill by 118 votes to 114.

Making Good Deficiencies.

On Clause 3 (which deals with the application of the Reserve Suspense Fund and Central Fund towards making good deficiencies due to the provisions of Part 1 of the Bill),

Mr. R. J. DAVIES moved an amendment to provide that the valuation of societies should take into account the necessary provision for continuing any additional benefits granted in respect of the surpluses of the first and second valuations. He said that the purpose of the amendment was to make sure that an approved society which had paid additional benefit as a result of the second valuation should not be in a worse position as a result of Clause 3 than it would have been if the clause had never been part of the Act. The clause provided that where a society was found on a certificate of the actuary to be in deficiency, that deficiency should be made up from a pool of surpluses of the other societies. Where a society had been giving, for the purposes of illustration, 2*s.* a week additional benefit for sickness, an additional 1*s.* for disablement benefit, and an additional 5*s.* for maternity benefit, besides dental treatment and dentures, and optical treatment and optical appliances, the amendment would enable the society to pay this additional benefit in spite of the provisions of this clause. It was agreed that, owing to Clauses 1 and 2, at least 10 per cent. of the societies would be in deficiency. That meant that 1,500,000 persons would suffer a deficiency through their approved societies.

Mr. N. CHAMBERLAIN said that he thought that Mr. Davies was not quite correct when he assumed that the societies representing 10 per cent. of insured persons who, as suggested by the actuaries, would be thrown into deficiency, would thereby be worse off. The provisions of this Bill were such that at any rate in some of those cases they would be no worse off. He would like to point out to the Committee what would be the effect of this amendment. Supposing that owing to some general cause the surpluses of all societies were reduced at the next valuation on account of an epidemic of disease, under the amendment there would be no claim on the fund from the careful society, but other societies which, through their laxity and carelessness might have brought down their surpluses on the third valuation, would immediately and automatically come in for a claim on the Reserve Suspense Fund. He did not think that this would be welcomed by the societies, and he could not accept the amendment.

Dr. DRUMMOND SHIELS said that it was rather alarming to find that the Minister of Health contemplated that after the third valuation a substantial number of societies might find it necessary to cut down the benefits given after the second valuation. It must be kept in mind that these additional benefits were not extra gifts, or something really outside the scope of the fund. They were simply an attempt to come a little nearer to the object of the insurance system. A full and complete medical service and adequate financial benefits were designed from the very first. Restrictions on these were principally made so that time might be given to show the financial soundness of the scheme, and how it had stood the strain of the war years. Now that these things had been assured it had naturally been expected, and the approved societies contemplated, bringing the scheme somewhat more into line with what was originally intended, and, therefore, these additional benefits which were being given as the result of the second valuation were not largess which might be taken away when circumstances were less propitious; they were steps on the road to a full realisation of a complete insurance scheme. The Minister's statement, therefore, would come as a very great surprise and shock to those who had been working the Act. It could not too often be emphasised that every penny which could be accumulated by this fund was required to make the scheme efficient, which at present it was not. For instance, no medical scheme could be successful that did not provide for efficient dental treatment. There was also the question of specialist medical benefit. In view of the enormous complexity of diseases and the great increase in specialist treatment nowadays, it was perfectly ridiculous to maintain a purely general practitioner's service for panel patients. He thought the least the Government could do was to say that in the event of a deficiency on the third valuation they would make up not only the minimum statutory benefits but any other benefits which might have been given, and to which the insured persons quite rightly thought they were entitled.

Mr. LLOYD GEORGE asked the Minister of Health whether he accepted the amendment in its present form or not to guarantee that through no action of the Government would there be any withdrawal of benefits already declared.

Mr. N. CHAMBERLAIN said that it was much too soon to be able to say what they would be able to do in 1931. The actuaries were themselves unable to say. But what they did know was that while there was a reduction in the State contribution there were also various other factors, such as the rate of interest, the increasing amount and proportion of the societies' funds on which that rate of interest was earned, and the increasing number of contributors that might be expected each year. But the surpluses must fluctuate. It was therefore asking something that had never been contemplated to ask that additional benefits should be in the same position as if they were statutory benefits.

After further discussion the closure was carried by 162 votes to 104. The amendment was then negatived by 163 votes to 106.

Clause 3 was added to the Bill by 163 votes to 105.

Clause 4 of the Bill amends Section 68 of the principal Act. Para. (*b*) of Subsection 2 of the clause deals with the appropriation of certain sums for defraying such proportion as is not derived from moneys provided by Parliament of any liability outstanding on Dec. 31st, 1926 (after exhausting all sums applicable thereto under Section 1 of the National Health Insurance (Cost of Medical Benefit) Act, 1924), in respect of the cost of drugs, medicines, and appliances supplied as part of medical benefit.

After debate the clause was added to the Bill by 155 votes to 83. Progress was reported.

Health Insurance in the Services—(continued).

On Thursday, April 15th, the House went into Committee on the Economy Bill, Mr. JAMES HOPE in the chair.

On Clause 5 (which deals with the transfer to the Exchequer from the Navy, Army, and Air Force Insurance Fund, constituted under the principal Act, of £1,100,000),

Mr. RICHARDSON moved to leave out Subsection (1), which transfers the sum of £1,100,000 from the fund to the Exchequer.

Dr. VERNON DAVIES said that the supporters of the Government had listened to many criticisms of this Bill, and they had been accused of cowardice for not speaking in support of it. The Opposition were wrong in thinking that they had remained quiet because they were not willing to support the Government, or because the Opposition's arguments had convinced them. He thought that the Government were acting honestly and seriously in this matter. But he hoped that the Secretary for War would pass on to the Chancellor of the Exchequer the suggestion that there was a crying need in the Service for some of this money. He referred particularly to the question of tuberculosis, which in the Services was at present an extremely urgent one. The medical authorities decided whether tuberculosis was attributable to the conditions of service or not, and as far as he could make out there was no appeal against their decisions. Consumption was caused by a bacillus which everyone was breathing in every day of his life. They did not get consumption and die from it, because the condition of their bodies was such that they were able to resist the germ. But no doctor, whether in the Navy, Army, or Air Service, was in a position when a man had contracted consumption to guarantee that it was attributable to the conditions of his service or not. It was only a guess, though it might be a very good guess.

During the past few weeks he had obtained definite statistics from the three Services, and he found that in the last three years the number of men invalided from the Air Force suffering from consumption was 92, from the Army 601, and from the Navy 479, giving an average of 390 per annum over the three Services. He found that the War Office had no records to show how many cases of the disease

could be attributed to or aggravated by conditions of service. In the Navy 1·46 per cent. of the cases were held to be attributable to service and were granted pensions; in the Air Force 18·47 per cent. were held to be so attributable. He called the attention of the Committee to the remarkable difference between the figures for these two Services, and of the two he would think undoubtedly the Navy was the more unhealthy, because there there were men serving in submarines and torpedo boats, at times in very trying circumstances. He wondered whether the Air Force, being a junior Service, had perhaps not yet found out by tradition and precedent a rule of thumb for dealing with this matter. Perhaps they allowed a freer hand and had been a little more charitable to the men concerned. There must be some definite cause why apparently the Air Force medical officers were more sympathetic than those in the other Service. It was absolutely impossible in the majority of cases in either of the Services to define accurately whether the cause of the disease was attributable to the conditions of service, though one might have shrewd suspicions. That was not a sufficient ground for granting or refusing a pension. In all cases there was a very thorough examination, and a man who was found to have consumption was invalided out of the Service. But if it was found that the disease was not attributable to the conditions of service, the man could get nothing. He knew cases which went to show that under present conditions the amount of money which these men received as gratuity, and from the National Insurance Fund or the Services Fund, was grossly inadequate, and for the sake of their health and their lives it was necessary that some other means should be found of assisting them. Here there was a fund which could be partly applied to that purpose. He would suggest a scheme of compulsory insurance against consumption. If all the men paid 1*d.* per week it would provide each man invalided out of the Service with £100 capital. Out of the £1,100,000 with which the Committee was now dealing, a grant could be made of £250,000 to produce £10,000 a year, and taking the average of the cases of the last three years he reckoned that a sum of £40,000 a year would be sufficient to give these men £1 a week as long as they lived. He took it that the average period of life in these cases would be two years.

Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) said that under the proposals of the Government a certain section of the men in whom Dr. Vernon Davies and other hon. Members were interested—the men who were unable to join the approved societies—would be able to receive much better benefits and assistance. As a result of the Government's proposals the cash benefits to these men would be increased in sickness to 18*s.* a week, to 9*s.* in respect of disablement benefit, and 46*s.* for maternity benefit—a very considerable increase. In addition they would receive, as recommended by the Royal Commission, the treatments which, on the average, were given, such as dental treatment, on the lines of the approved societies' additional benefits. The selection of these benefits would be made by the Minister of Health with the aid of the Committee which managed the Fund, and regulations would be laid before the House of Commons.

Mr. LLOYD GEORGE regretted that Sir Kingsley Wood had not found it possible to give a more sympathetic answer to the appeal which had been made by Dr. Vernon Davies.

Mr. Richardson's amendment was negatived by 227 votes to 141.

Clause 5 was added to the Bill by 229 votes to 124.

Clause 6 (which deals with consequential amendments of enactments relating to National Health Insurance and variation of reserve values) after discussion was added to the Bill by 225 votes to 132.

Clause 7 (short title and construction and application of Part 1 of the Bill) was agreed to by 216 votes to 128.

MIDWIVES AND MATERNITY HOMES BILL.

This Bill, introduced by Colonel F. E. Fremantle and supported by the Government, to amend the Midwives Acts, 1902 and 1918, and to provide for the registration of maternity homes and other purposes, was considered by Standing Committee A of the House of Commons on Tuesday, April 20th, when Sir Kingsley Wood moved a drafting amendment to Clause 1, with the object of making it clear that there should be no possibility of admitting any man to the Midwives Roll. The Chairman ruled that if this amendment were passed it would cut out an amendment by Major Hills to substitute for "the personal supervision of a duly qualified medical practitioner" the words "in the presence of a duly qualified medical practitioner." Colonel Fremantle had a similar amendment to propose. Sir Kingsley Wood said he understood that the Central Midwives Board were now content with the clause as drafted, and his amendment was agreed to. An amendment to Clause 2, moved by Sir Kingsley Wood, to entitle a midwife suspended on account of infection to recover compensation from the local supervising authority, was agreed to. His further motion to leave out Clause 3 was negatived. An amendment by Sir D. Newton to make the councils of non-county boroughs and urban districts the authority to administer the Bill in their areas was discussed.

HOUSE OF COMMONS.

TUESDAY, APRIL 13TH.

Service Medical Organisation.

Mr. HAYES asked the Secretary of State for Air what was the total cost of the headquarters medical organisation of the Royal Air Force; and whether he was taking steps to prevent overlapping between the Royal Air Force medical services and the medical services of the Navy and Army.—Sir S. HOARE replied: The answer to the first part of the question is £13,026, including clerical staff. As regards the second part, the fullest use is made wherever possible of naval and military hospitals for Air Force patients. There are only three separate Air Force hospitals in this country, and of these two are situated at stations at which large numbers of Air Force personnel are concentrated, but which are remote from any hospitals administered by the other Services; the third is a small hospital with only 25 beds, primarily intended for officers suffering from flying disabilities. Conversely the existence of Air Force hospitals in Iraq and Palestine eliminates the need for maintaining British or Indian Army hospitals for the imperial and local ground forces in those countries. To illustrate the extent to which effective coördination has been carried, I may say that during 1925 the admissions of personnel (including families) of the Royal Air Force to naval and military hospitals numbered 3227, whilst during the same period there were upwards of 3000 admissions of personnel of the Navy, the British and Indian Armies, and local forces in Iraq and Palestine to Air Force hospitals. The possibility of further coördination as between the Air Force medical service and the medical services of the Navy and Army (as well as the Ministry of Pensions) is kept continually under review by a Joint Medical Services Committee set up in accordance with the recommendations made by the Committee presided over by Sir A. Mond and announced in this House on May 30th, 1923. This Joint Committee advises in regard to: (1) important questions of medical policy such as the construction of new hospitals; (2) provision of facilities for common training; (3) specifications for the supply and medical stores and appliances; (4) the use of Navy, Army, and Air Force hospitals for the accommodation of disabled pensioners; (5) all matters in respect of which economies might be effected by coöperation of the four departments. Regular meetings have been held and the Committee has been successful in securing the closest coöperation and coördination of medical work in the three Services.

THURSDAY, APRIL 15TH.

The University of London.

Sir CYRIL COBB asked the President of the Board of Education whether the Government had arrived at a decision on the recommendations of the departmental committee on the University of London.—Lord E. PERCY replied: Yes, Sir. The Government are in general agreement with the committee's recommendations, and they propose to introduce legislation for the purpose of setting up a statutory commission for the university accordingly.

Slum Clearances.

Mr. TREVELYAN THOMSON asked the Minister of Health how many local authorities had put in hand schemes for slum clearances under the Housing Act of 1919 and subsequent Acts.—Mr. N. CHAMBERLAIN replied: Since 1919, 73 local authorities have submitted schemes for dealing with slum areas, and I have information of 33 other local authorities who have schemes in preparation or under consideration. Eighty-five schemes relating to 67 local authorities have been confirmed.

Progress of Housing Schemes.

Mr. TREVELYAN THOMSON asked the Minister of Health how many houses had been completed to date under the 1919 and subsequent Housing Acts and how many were at present under construction, giving separate figures for municipal and private enterprise.—Mr. N. CHAMBERLAIN replied: Up to the 1st instant 238,219 houses had been completed in England and Wales under the 1919 and subsequent Housing Acts by local authorities and 153,289 by private enterprise. The numbers under construction on the 1st instant were 45,920 by local authorities and 35,088 by private enterprise.

Deposit of Refuse in Rural Areas.

Mr. RYE asked the Minister of Health whether he would consider the advisability of bringing in legislation which would strengthen the powers of local authorities in rural areas

and enable them to prevent the deposit of refuse and other offensive matter in public places and so maintain local amenities.—Mr. N. CHAMBERLAIN replied: I am not satisfied, on present information, that further powers would be of any great practical advantage, but I am prepared to consider any further evidence that may be brought to my notice.

Miners' Welfare Fund and Hospital Grants.

Mr. THOMAS WILLIAMS asked the Secretary for Mines how many grants had been made out of the Miners' Welfare Fund to assist in the erection of new hospitals or to extend existing hospitals; the districts where the grants were made; and the amount of such grants.—Colonel LANE FOX replied: Thirty-one allocations have been made out of the Miners' Welfare Fund to assist in the erection of hospitals or to extend existing hospitals in the districts of Fife, Northumberland, Durham, North Wales, West Yorkshire, South Derby, Warwickshire, Forest of Dean, and South Wales. The total amount of the allocations is £53,720. I am sending the hon. Member a detailed list of the schemes.

MONDAY, APRIL 19TH.

Indian Medical Service.

Colonel APPLIN asked the Under Secretary of State for India whether he was aware that officers of the Indian subordinate medical service who served with the Army throughout the war, and had since qualified in Great Britain in medicine and surgery, were debarred from entering the Indian Medical Service because their war service prevented them qualifying within the age limit; and if he would consider extending the age limit to 34 years in the case of medical officers who had been prevented from qualifying before reaching the age of 32 by reason of such war service.—Earl WINTERTON replied: Admission to the Indian Medical Service of members of the Indian Medical Department was one of the matters raised by the recent Anglo-Indian Deputation. My hon. and gallant friend's suggestion will be considered when the Government of India's views have been ascertained.

The Tuberculosis Order, 1925.

Brigadier-General CLIFTON BROWN asked the Minister of Agriculture if he would state how many animals had been destroyed under the Tuberculosis Order of 1925; how much compensation had been paid on this account by the Government; and how much by the county rates.—Mr. GUINNESS replied: From Sept. 1st, 1925, when the Order came into operation, up to Dec. 31st last, 7151 cattle were slaughtered by local authorities and £31,294 paid by them in compensation. In accordance with the Diseases of Animals Act, 1925, £23,470 has been refunded by the Ministry, leaving the remaining quarter of the cost, or £7823, to be met out of local rates. I understand that the local authorities have also received £7958 by the salvage of carcasses, which more than covers their share of the compensation.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY, Burlington House, Piccadilly, W.
THURSDAY, April 29th.—4.30 P.M., *The following papers will be read:* C. H. Best, H. H. Dale, J. P. Hoet, and H. P. Marks: Oxidation and Storage of Glucose under the Action of Insulin. C. H. Best, J. P. Hoet, and H. P. Marks: The Fate of the Sugar Disappearing under the Action of Insulin. (Communicated by Dr. H. H. Dale.) J. P. Hoet and H. P. Marks: Observations on the Onset of Rigor Mortis. (Communicated by Dr. H. H. Dale.) J. C. Mottram, G. M. Scott, and S. Russ: On the Effects of Beta Rays from Radium upon Division and Growth of Cancer Cells. (Communicated by Prof. A. W. Porter.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, April 26th.—8 P.M., ODONTOLOGY. Mr. W. Warwick James: Do Epithelial Odontomes Increase in Size by their own Tension? Dr. E. W. Fish: The Circulation of Lymph in Dentine, with some Observations on the Metabolism of this Tissue.
TUESDAY.—5.30 P.M., MEDICINE. Discussion: The Clinical Significance of the Respiratory Metabolic Rate. Opener: Dr. E. P. Poulton, followed by Dr. C. M. Wilson, Dr. Gardiner-Hill, Dr. R. D. Lawrence, Dr. Reginald Hilton.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.
FRIDAY, April 30th.—8.30 P.M., Papers will be read by Dr. Lacapere, of Paris, and Dr. R. C. Jewesbury, on Marriage and Syphilis. A discussion will follow.

SOCIETY OF SUPERINTENDENTS OF TUBERCULOSIS INSTITUTIONS.
MONDAY, April 26th.—3 P.M. (at 122, Harley-street), Dr. F. R. Walters: Some Needs and Indications for Treatment in Pulmonary Tuberculosis. Dr. F. A. Lucas Hammond: Phthisical Psychosis. Dr. S. Woodhouse: The Pathology of Pleural Adhesions in Tuberculosis.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, April 26th, to SATURDAY, May 1st.—Special afternoon demonstration in clinical surgery on Tuesday at 2 P.M., at the Royal Northern Hospital, by Mr. Gwynne Williams.—ROYAL FREE HOSPITAL, Gray's Inn-road, W.C. Wednesday, at 5.15 P.M., Dr. Heald will demonstrate the Medicinal Uses of Ultra-Violet Light.—ST. PETER'S HOSPITAL, Henrietta-street, W.C. Clinical work each afternoon and special lectures. Further information from the Secretary of the Fellowship of Medicine.

ANCOATS HOSPITAL POST-GRADUATE LECTURES, Quay-street.
THURSDAY, April 29th.—4.15 P.M., Mr. McEvedy and Dr. Twining: The Surgical Dyspepsias.

MANCHESTER AND SALFORD HOSPITAL FOR SKIN DISEASES POST-GRADUATE COURSE.
THURSDAY, April 29th.—4.30 P.M., Dr. Stavely Dick: Uses and Abuses of Laboratory Methods in the Diagnosis of Syphilis.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, April 27th.—4.15 P.M., Mr. S. R. Wilson: The Evolution of Anæsthetics.
FRIDAY.—4.15 P.M., Dr. A. E. Barclay: X Ray Investigation of the Intestinal Tract.

Appointments.

CADDY, A., M.D. Lond., F.R.C.S. Eng., has been appointed Assistant Surgeon to the Royal Westminster Ophthalmic Hospital and Ophthalmic Surgeon to the Woking and District Victoria Hospital.

EVANS, T. B., M.B., Ch.B. Liverp., Medical Officer of Health, Abersoch, S. Carnarvonshire.

HALL, ARTHUR, M.D. Camb., F.R.C.P. Lond., Consulting Physician to the South Yorkshire Mental Hospital, Sheffield.

SOLLY, E., M.B. Lond., F.R.C.S. Eng., a Medical Referee under the Workmen's Compensation Act for Bradford, &c. (Circuit No. 12).

STURROCK, Eva M., M.B., Ch.B. Glasg., D.P.H., Assistant Medical Officer of Health, Burgh of Motherwell and Wishaw.

Wrexham and East Denbighshire Hospital: DAVIES, A. L., M.B., Ch.B. Liverp., WALWYN, F., L.R.C.P & S. Edin., REID, J., M.B., Ch.B. Edin., Hon Asst. Physicians and Surgeons; WILSON, M.B., Ch.B. Dub., Hon. Ophthalmic Surgeon; GRACE, W. H., M.D. Lond., Hon. Pathologist; WALLIS, R., Hon. Dental Surgeon.

Vacancies.

For further information refer to the advertisement columns.

Beit Memorial Fellowships for Medical Research.—Jun. Fellows. £350.
Bristol Royal Hospital for Sick Children and Women.—H.S. £125.
Bristol University.—Lecturer in Forensic Medicine and Toxicology. Also Lecturer in Public Health.
Burton-on-Trent Infirmary.—Jun. Res. H.S. £150.
Cancer Hospital, Fulham-road, S.W.—H.S. At rate of £100.
Coventry and Warwickshire Hospital, Coventry.—Res. H.S. £150. Res. H.P. £125.
Dagenham Sanatorium, Dagenham, Essex.—Asst. M.O. £250.
Durham County Mental Hospital.—Second Asst. M.O. £500.
Greenwich, Dreadnought Hospital.—Med. Supt. £300.
Hampstead General and North-West London Hospital, Haverstock Hill, N.W.—H.S. and Cas. Surg. O. Each at rate of £100.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Med. Reg. £100.
Leicester Royal Infirmary.—H.P. At rate of £120.
Liverpool, Eye and Ear Infirmary, Myrtle-street.—Hon. Aural S.
London Hospital, E.—Asst. in Dept. of Dermatology and Syphilology.
Metropolitan Asylums Board, Mental Hospitals Service.—Second Asst. M.O. £560. Also Jun. Asst. M.O. £500.
Plymouth Borough.—Asst. Port M.O., &c. £750.
Preston and County of Lancaster Royal Infirmary.—Hon. Surg. to Eye, Ear, Nose and Throat Dept. Also Hon. Asst. S.
Prison Medical Service.—M.O. £350.
Richmond, Surrey Royal Hospital.—H.S. and Asst. H.S. £150 and £100 respectively. Also Hon. P. to Out-patients.
Royal College of Surgeons in Ireland.—Prof. of Physiology.
Royal Northern Hospital, Holloway.—Surg. and Phys.

St. Mary's Hospital, W.—First Asst. Pathologist. £500.
Salisbury General Infirmary.—H.S. £150.
Sheffield Royal Infirmary.—Jun. Aural and Ophthalmic H.S. £80.
Surrey County Council, Kingston-on-Thames.—Asst. M.O. £600.
University College Hospital, Gower-street, W.C.—Harker Smith Reg. £250. Also Obstetric Reg. £125.
Wigan Infirmary.—Third H.S. £150.

The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Biggar (Lanarkshire).

The Secretary of State for the Home Department announces a vacancy for a Medical Referee under the Workmen's Compensation Act for the Kilmarnock District (Sheriffdom of Ayr). Applications should reach the Private Secretary, Scottish Office, not later than May 12th.

A vacancy for a Medical Referee under the Workmen's Compensation Acts (Northern Ireland) for the County of Down is announced. Application should be made to the Secretary, Ministry of Labour, 7, Upper Queen-street, Belfast, not later than May 8th.

A vacancy for a special appointment of a Medical Practitioner under the Workmen's Compensation Act, 1906, for cases arising in mines in the district of Ashton-in-Makerfield is announced. Applications for the post or for further information should reach the Private Secretary, Home Office, Whitehall, London, S.W. 1, not later than May 15th.

Births, Marriages, and Deaths.

BIRTHS.

ATKIN.—On April 12th, at The Glen, Sheffield, the wife of C. S. Atkin, M.B., of a son.
GURNEY-DIXON.—On April 14th, at Ober House, Brockenhurst, Hants, the wife of S. Gurney-Dixon, J.P., M.D., of a daughter.
MASON.—On April 15th, at Great Portland-street, W., the wife of Dr. C. L. Mason of a daughter.

MARRIAGES.

BICKERTON—HAWDON.—On April 10th, at St. Cuthbert's Church, Ormesby, Yorkshire, by the Ven. Archdeacon Lindsay, assisted by the Vicar, the Rev. J. C. C. Kemm, John Myles Bickerton, F.R.C.S., youngest son of Mr. and Mrs. T. H. Bickerton, of Liverpool, to Margaret Alsager, only daughter of Colonel and Mrs. Hawdon, Upsall Grange, Nunthorpe, Yorkshire.
BOYLE—RUANE.—On April 14th, at SS. Peter and Paul Church, Ilford, Captain H. A. Boyle, R.A.M.C., to Mary Ellen Ruane, eldest daughter of Mrs. Catherine Ruane, of Ilford, Essex.
VON BRAUN—COLE-HAMILTON.—On April 15th, at the British Embassy Church, Paris, C. R. B. von Braun, M.R.C.S., L.R.C.P., late Captain, R.A.M.C., to Nora Kathleen, only daughter of Major W. M. Cole-Hamilton, Beltrim Castle, Co. Tyrone.
GIMLETTE—WILSON.—On April 14th, at St. Jude's Southsea, Captain G. T. Gimlette, R.A.M.C., to Mary, younger daughter of Mr. and Mrs. A. Wilson, Southsea.
HUSBANDS—FIELD.—On April 14th, at All Souls', South Hampstead, Roland Husbands, M.B., B.S. Lond., to Dorothy, younger daughter of the late A. J. Field, of Bushey, and Mrs. Field, of Oxhey, Herts.
MCKINLAY—ALEXANDER.—On April 17th, at the Parish Church, Walton-on-Thames, Captain R. McKinlay, to Audrey Forbes, elder daughter of Dr. Forbes Alexander and the late Mrs. Forbes Alexander, Clevedon, Weybridge.
SHERWELL—WILKINSON.—On April 16th, at St. Saviour's, Torquay, Arthur Erskine Sherwell, M.B., Ch.B., to Mary Eileen Grace Wilkinson, L.S.A., eldest daughter of Dr. and Mrs. T. B. Wilkinson, of Plymouth.

DEATHS.

BOTT.—On April 14th, at Washenden Manor, Biddenden, Kent, Henry Bott, M.R.C.S., L.R.C.P., late of Brentford, aged 73 years.
BOUCH.—On Tuesday, April 13th, Thomas Bouch, of 45, Northcote-avenue, Ealing.
SMITH.—On April 13th, at Richmond House, Ingleton, Carnforth, Yorks, John William Smith, D.L., F.R.C.S., Brev. Col., R.A.M.C. (Territorial Force), late of Manchester, aged 61.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

ENLARGEMENT OF CHARING CROSS HOSPITAL.—The Royal Westminster Ophthalmic Hospital has been purchased for the enlargement of Charing Cross Hospital, which it adjoins, but it is expected that two years will elapse before the building is available. Both institutions are in need of enlargement, but until now neither could expand save by removal, and even as it is the cost of buying and converting the ophthalmic building is estimated at £100,000. It is intended to use it for heart cases and ear, nose and throat patients. The Ophthalmic Hospital has acquired a site in Broad-street, Bloomsbury, large enough for the erection of "the largest and finest ophthalmic hospital in London."

Notes, Comments, and Abstracts.

HEALING SAINTS.

THE amusing communication from Sir Wilmot Herringham on hagiological therapeutics (THE LANCET, March 13th, p. 574) has stimulated a correspondent to send us the following note on an interesting statuary group of healing saints in Brittany. He writes:—

"Perched on its rocky hill between two deep glens stands old grey Montcontour in Brittany. Before the days of the light railway the small town was one of the most primitive in an old-world countryside, for there the bare-footed peasant women still used the distaff and the coach-horses were led over the earthen floor of the inn kitchen into the stable beyond. Rudimentary beliefs die hard in such surroundings, and it is probable that even to-day the peasants of the district still offer prayer to the *saints guérisseurs* in the chapel of Notre Dame du Haut, about a mile away from Montcontour. These renowned saints are six in number and are represented by expressive images of fifteenth-century date. St. Lubin, to the right of the row of statues, is a bishop in full canonicals. His face is beatific in expression and he raises one hand in act to bless. He is invoked by the sick in all kinds of illness. Next to him is the tall figure of St. Mamert, whose office it is to cure diseases of the intestines. He is in a monkish habit and his abdomen, in appearance like a large flat oval loaf, is displayed outside his robe. He clasps this with his two hands, and his face expresses suffering. A bishop with crozier and open mass book directly on his left is St. Méen, patron of the demented. Then comes a little dapper huntsman armed with a spear and reminiscent of Chaucer's Canterbury Pilgrims. This is St. Hubert, who is good against dog-bite, especially in cases of hydrophobia. St. Livertin, fifth in the row, is a tall priest. He is invoked by those who suffer from headache, and his functions are well expressed by his finger-tips, which are laid to his temples. The pose suggests facial neuralgia, and this is probably the ailment most in vogue among a hardy people not otherwise worried by head troubles. Most curious of all this sextet is the last saint in the row. This is St. Honarniole, who guards against fear. The sufferer from phobias of various kinds prays to him, and he wears a reassuring expression and appears to be walking cautiously forward supported by two long staves, one in each hand. His long hair, beard, and dress suggest the layman, and his name indicates a purely local celebrity."

With reference to the exact connexion between the healing saints of early Christianity and mediæval days and the healing divinities of the classical era our correspondent writes: "That healing saints are certainly traceable to a pagan original was well shown by the late Prof. Tylor in his 'Primitive Culture.' In the chapters on Animism he cites two prime instances of this process of transition. Thus St. Theodorus has apparently succeeded Romulus as the patron of sickly infants, his church occupying the site of the little round temple at the foot of the Palatine, whither the mothers of ancient Rome brought their children to be presented to the founder of the city, who had been deified as propitious to their health and safety. In his famous 'Letter from Rome,' whose sceptical tendencies got him into trouble, Conyers Middleton, Bentley's bitter adversary, describes how he used to look in at the church of St. Theodorus and see groups of women, each with a sick child in her lap, sitting in silent reverence before the altar of the saint. The ceremony of blessing children, especially after vaccination, may still be seen there on Thursday mornings. SS. Cosmas and Damianus are generally acknowledged to owe their recognised office as healing saints, and especially of plague, to a similar train of events. They were martyrs who suffered under Diocletian at Aeqaeae in Cilicia. Now this place was one of those particularly celebrated for the worship of Æsculapius, in whose temple incubation—i.e., sleeping for oracular dreams—was practised. 'It seems,' writes Tylor, 'as though the idea was transferred on the spot to the two local saints, for we next hear of them appearing in a dream to the Emperor Justinian when he was ill at Byzantium. They cured him, he built them a temple, their cultus spread far and wide, and they frequently appeared to the sick to show them what they should do.' SS. Cosmas and Damianus were thus manifest descendants of the old Asclepiades. According to legend they had been physicians before their martyrdom, and they became the patron saints of the profession of medicine."

AUSTRALIAN HOSPITALS.

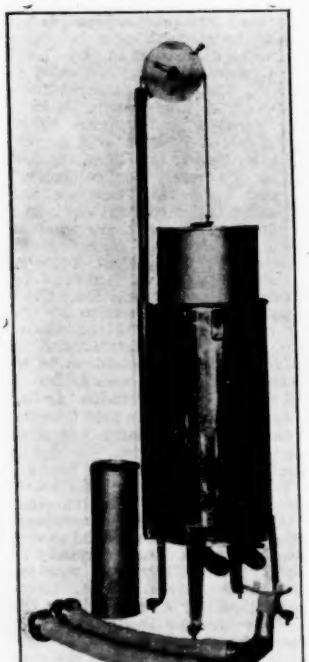
THE growing pressure upon hospitals which is creating so difficult a problem at home is being experienced also in the Commonwealth. The report of the Public Health and Hospitals Department of Western Australia for 1923 and 1924, which has just reached us, shows that during that period in the larger hospitals, especially that at Perth, the

increased demands upon accommodation have reached serious dimensions. In the country districts, some of which have no hospital provision, the need has become so great that 18 new hospitals have been opened. There are three public hospitals in the State with an average of 520 beds occupied in 1924, an increase of nearly 20 per cent. since 1921. The average of 81 occupied beds in the 37 assisted hospitals shows an even larger growth. The same tendency is noticeable in the 24 Government hospitals, the number of patients treated having been 5900 in 1924 as compared with 3877 in 1922. We note that the daily cost per patient in these hospitals was 9*s.* 4¼*d.*, which is a reduction on previous years. The death-rate of Western Australia in 1923 was 8·41, a "record" for the Commonwealth.

The report of the *Royal Prince Alfred Hospital, Sydney*, for the year ending June 30th, 1925, shows that 7740 patients were admitted, and that their mean residence was 24 days. In the out-patient and casualty departments 47,000 persons were treated. The work of the pathological department greatly increased, and there was also a large increase in the use of insulin. The whole question of the treatment of tuberculosis in the Sydney hospitals is under consideration, and it appears to be probable that a central bureau will be established for the better coördination and direction of the work throughout New South Wales. Owing to the change in the medical curriculum, which now extends over six years, and a falling off in the number of students entering the medical school, the number of students attending the hospital was only about half that of the previous year.

ESTIMATION OF BASAL METABOLIC RATE.

THE estimation of basal metabolism by the British "Benedict" portable metabolism apparatus is a *closed circuit* method in which the oxygen consumption is measured directly. Its simplicity, rapidity, and accuracy are causing it largely to supersede, at least for clinical purposes, the standard *open circuit* method of employing the Douglas bag and gas analysis. The latter, although the choice for really exact scientific work, is too time-consuming and laborious for ordinary routine at the bedside. And further, unless the operator is specially skilled and exceedingly careful wrong results are apt to be obtained, and perhaps not infrequently results very far wide of the mark. The technique required for the method is less involved and laboratory assistance is unnecessary, but, nevertheless, the same careful attention to details must be observed. The apparatus is conveniently portable, and as regards accuracy, the all-important point, it has been shown that in competent hands results are obtained that compare well with those of the Douglas bag method.



The apparatus illustrated consists of a spirometer cylinder (6½ litres capacity), balanced by a weight-and-pulley arrangement suspended over a double-walled cylinder, and dipping into a water-seal between the vertical walls. The spirometer is filled with oxygen and the patient inhales from, and exhales into, this enclosed circuit through two breathing tubes provided with inlet and outlet valves. Within the inner cylinder is a container of soda-lime (calsoda) which removes all the carbon dioxide. Therefore, the difference between the readings taken on the self-registering dial of the pulley-wheel at the beginning and end of the test gives the amount of oxygen consumed. Corrections are made for temperature and pressure, and a comparison with figures for normal persons of the same weight, height, and age shows whether the metabolic rate is up or down. Three or four 4–7 minute tests are generally required, and since gas analysis and other laboratory determinations are unnecessary, results can be had a few minutes after finishing the tests. Two modifications in this apparatus on its immediate predecessor —the "Handy" Sanborn, described and recommended by Mr. T. C. Hunt in THE LANCET of Jan. 23rd (p. 172)—should be favourably mentioned: (1) the introduction of inlet and outlet valves prevents any re-breathing of CO_2; (2) the inertia of the spirometer cylinder is practically eliminated by the counterpoise pulley arrangement.

Considerable experience with the method has shown that in addition to the ordinary care in technique special attention should be directed to the following points, as it is here that error is most liable to creep in: (1) The entire apparatus should be thoroughly tested for leaks. (2) The spirometer cylinder must be accurately balanced by means of the four levelling screws and the pulley counter-weight. (3) The most vital part of the apparatus is the carbon dioxide absorber, and it demands systematic examination, say, once or twice a week, or oftener if needed. The capacity of the calsoda to absorb CO_2 should be tested for by filling the spirometer-bell with expired air, plugging the mouth-piece and causing the contents to pass out via the oxygen inlet-tap and bubble through lime-water. If the calsoda is all right no cloudiness will occur. (4) It is essential that the readings at the beginning and end of a test are taken in the course of periods of steady regular fall in the volume, as shown by the hand on the dial. For this purpose a stop-watch is of great service, as readings may then be taken at any fraction of a minute when the breathing is satisfactory and accurate calculations made.

The British "Benedict" apparatus is sold by Herbert E. Kendrick, 342, St. John-street, London, E.C. 1.

VOCAL THERAPY FOR DISABLED MEN.

AMONG the various organisations for bringing help to the minds and bodies of the men still disabled after the war, the Vocal Therapy Society, whose report for 1924–25 is to hand, plays a modest but nevertheless a decidedly useful part. The report states that its aims are: "1. To promote through speech, song, and efficient breathing the physical and mental health of sick, wounded, and disabled sailors, soldiers, and airmen in hospitals and centres of discharged men. 2. To adopt under medical advice the most effective methods of individual and class training in singing, speaking, and breathing. 3. To select voluntary and paid teachers with the necessary high qualifications. 4. In furtherance of these aims to form the hospital and other ex-Service singers into choirs." The beneficial results of correct instruction in breathing and voice-production are undoubted in those suffering from speech-defects, injuries of the jaws, and paralyses; but, apart from these more obvious cases, many of the chronically disabled patients are awkward, self-conscious, and miserable. It appears from the report, as would be expected, that the singing and dancing classes have given such patients an interest, relieved their shyness, and improved their morale. The society has a number of distinguished musicians and medical men upon its committee, and employs half a dozen teachers; it cannot afford more, and its activities have had to be curtailed owing to decreasing funds. But there are still, unfortunately, many thousands of disabled men, and we commend this society to the interest of the philanthropic.

THE NORTH-WESTERN NATURALIST.

WE heartily congratulate Mr. A. A. Dallman on the first number of this successor to the *Lancashire Naturalist* which has recently appeared under his editorship. There is evidently no dearth of good material in Lancashire, Cheshire, North Wales, and the neighbouring parts, and the activity of the workers will reciprocate with an adequate publication of their results to promote one of the most humane of human interests in which medical men have always taken a leading part. The number contains a sympathetic notice of the late Dr. H. Drinkwater, who filled up the spaces in a distinguished career as a doctor at Wrexham with notable contributions to botany, medical biography, and Mendelian heredity. Prof. A. E. Boycott has a short article on a unicellular alga apparently parasitic in a water-snail, and there are many notes of biological and antiquarian interest. If the present standard can be maintained we do not doubt the success of the new venture. The most substantial paper is a survey, along ecological lines, of the daddy-long-legs of Carnarvonshire by Mr. H. F. Barnes.

"C.P."

WE have been used to this abbreviation for many years in this country as signifying Clerk of the Peace, Common Pleas, Court of Probate, and last, but not least, Carter Paterson and Carriage Paid, and in technical circles as Chemically Pure. We now see that C.P. in the United States is to stand for "Council Passed," meaning, when affixed to a chemical product, that it has been approved by the Council on Pharmacy and Chemistry of the American Medical Association, and accepted by them for inclusion in new and non-official remedies.